DOCUMENT RESUME

ED 266 319 CE 043 635

AUTHOR Lewis, Morgan V.; Norton, Lee

TITLE Forces and Factors Likely to Influence Vocational Education: The Aging Population.

INSTITUTION Ohio State Univ., Columbus. National Center for Research in Vocational Education.

SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE 86
CONTRACT 300-83-0016
NOTE 89p.
PUB TYPE Information Analyses (070)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS *Aging (Individuals); Demography; Economic Factors; Educational Change; Educational Trends; *Enrollment Trends; *Futures (of Society); Influences; Labor Force; Models; Older Adults; Participation; *Population Distribution; *Population Trends; Postsecondary Education; Retirement; School Demography; Tables (Data); Technological Advancement; *Vocational Education; Work Attitudes

ABSTRACT

The aging of the population is one of the major influences on the environment in which vocational education operates. The number of people 65 and older will increase more slowly in next 25 years than in the past. Improvements in working conditions, health care, and pension plans since World War II have made those who will be 65 by the end of the century healthier and more financially secure than previous generations of the elderly. Medical advances that should lead to sizeable increases (5 years or more) in the life expectency of the elderly in this century are not likely. A significant proportion of those approaching age 65 express interest in working, usually on a part-time basis; however, labor force participation by males 55 and over has been declining steadily. These findings suggest that those elderly persons who are most likely to want and need vocational education are the poor and near-poor. The role that appears most appropriate for vocational education is to serve those who wish to work but lack skills. (Appendixes to this report include a model of the major influences on vocational education, a list of the information sources scanned on a regular basis during this study, and seven pages of references. (MN)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED266319

FORCES AND FACTORS LIKELY TO INFLUENCE VOCATIONAL EDUCATION: THE AGING POPULATION

Morgan V. Lewis
Lee Norton

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

CE 043635

The National Center for Research in Vocational Education
The Ohio State University
1960 Kenny Road
Columbus, OH 43210-1090

1986

FUNDING INFORMATION

Project Title:	National Center for Research in Vocational Education, Information for Planning and Policy Development
Contract Number:	300830016
Project Number:	0510C50010
Act under Which Funds Administered:	Education Amendments of 1976 P.L. 94-482
Source of Contract:	Office of Vocational and Adult Education U.S. Department of Education Washington, D.C. 20202
Contractor:	The National Center for Research in Vocational Education The Ohio State University Columbus, Ohio 43210-1090
Executive Director:	Robert E. Taylor
Disclaimer:	This publication was prepared pursuant to a contract with the Office of Vocational and Adult Education, U.S. Department of Education. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their judgment in professional and technical matters. Points of view of opinions do not, therefore, necessarily represent official U.S. Department of Education position or policy.
Discrimination Prohibited:	Title VI of the Civil Rights Act of 1964 states: "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." Title IX of the Education Amendments of 1972 states: "No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance." Therefore, the National Center for Research in Vocational Education Project, like every program or activity receiving financial assistance from the U.S. Department of Education, must be operated in compliance with these laws.

TABLE OF CONTENTS

LIST OF TABLES..... v

FOREWORD..... vii

EXECUTIVE SUMMARY..... ix

CHAPTER 1. THE ENVIRONMENT FOR VOCATIONAL EDUCATION..... 1

The Economy..... 4

Technology..... 6

The Aging Population..... 9

CHAPTER 2. POPULATION PROJECTIONS, HEALTH AND ECONOMIC STATUS OF THE ELDERLY..... 11

Demographic Characteristics..... 11

Health Status and Health Care Expenditures..... 18

Income Status and Economic Resources..... 23

CHAPTER 3. LABOR FORCE PARTICIPATION AND ATTITUDES TOWARD WORK AND RETIREMENT..... 33

Labor Force Participation..... 33

Attitudes Toward Work and Retirement..... 36

Interest and Participation in Education and Training Among Older Adults..... 38

CHAPTER 4. THE PROSPECTS FOR LIVING LONGER..... 41

Life Expectancy and Life Span..... 42

Increasing Life Expectancy..... 42

Increasing the Life Span..... 44

Three Possible Scenarios..... 48

CHAPTER 5. IMPLICATIONS FOR VOCATIONAL EDUCATION..... 53

The Near Future..... 53

The Distant Future..... 59

APPENDIX A. MODEL OF MAJOR INFLUENCES ON VOCATIONAL EDUCATION..... 63

APPENDIX B. INFORMATION SOURCES SCANNED ON A CONTINUING BASIS..... 71

REFERENCES..... 75

LIST OF TABLES

Table		Page
2-1	POPULATION IN THE OLDER AGES AND DECENNIAL INCREASES BETWEEN 1960 AND 2050	13
2-2	PERCENT DISTRIBUTION OF THE POPULATION 65 YEARS AND OVER BY AGE BETWEEN 1960 AND 2050	14
2-3	FEMALE PERCENTAGE OF OLDER POPULATION	16
2-4	MARITAL STATUS OF THE OLDER POPULATION BY SEX BETWEEN 1965 AND 1995	17
2-5	LIVING ARRANGEMENTS OF THE OLDER POPULATION BY SEX BETWEEN 1965 AND 1995	17
2-6	EDUCATIONAL ATTAINMENT OF THE POPULATION 65 YEARS AND OVER AND 25 YEARS AND OVER BETWEEN 1959 AND 2000	18
2-7	LIMITATION IN ACTIVITY DUE TO CHRONIC CONDITIONS FOR THE OLDER POPULATION BY AGE BETWEEN 1980 AND 2040	19
2-8	ADMISSION RATES AND AVERAGE LENGTH OF STAY IN SHORT-TERM HOSPITALS FOR THE TOTAL POPULATION AND THE POPULATION 65 YEARS AND OVER BETWEEN 1970 AND 1979	21
2-9	RESIDENTS IN NURSING AND PERSONAL CARE HOMES BY SEX FOR VARIOUS AGE GROUPS BETWEEN 1964 AND 1977	22
2-10	MONEY INCOME OF AGED HOUSEHOLDS BY EMPLOYMENT STATUS OF THE HOUSEHOLD HEAD FOR 1980	25
2-11	POVERTY RATES FOR OLDER PERSONS BY RACE, SEX AND LIVING ARRANGEMENTS BETWEEN 1959 AND 1961	26
2-12	RELATIVE DISTRIBUTION OF VARIOUS INCOME SOURCES FOR OLDER PERSONS IN 1967 AND 1981	28
3-1	LABOR FORCE PARTICIPATION RATES AMONG MIDDLE-AGED AND OLDER PERSONS BETWEEN 1950 AND 2000	35

4-1 LIFE EXPECTANCY AT BIRTH AND AT AGES 65, 75, AND 80 IN 1900, 1954, AND 1980..... 43

4-2 ADDITIONAL YEARS OF LIFE EXPECTANCY AT BIRTH AND AGE 65 IN 1978 IF VARIOUS CAUSES OF DEATH HAD BEEN ELIMINATED..... 45

FOREWORD

For the past 3 years, the National Center has conducted a continuing study designed to assist planners and policymakers to anticipate the forces and factors that will shape the environment for vocational education in future years. This is the final report from that project.

The preparation of this report, and the five others from this project, was made possible with support from the Office of Vocational Education, U.S. Department of Education. The report was produced in the Evaluation and Policy Division which is directed by N. L. McCaslin. Project staff included Morgan Lewis, Research Scientist; Lee Norton, Graduate Research Associate; and Vicki Owens, Typist II, who also performed the word processing for this report.

Several individuals, in addition to project staff, contributed significantly to this report. A preliminary draft of the chapter on implications for vocational education was circulated to the following individuals for review and suggestions: Donald Drewes, Professor of Psychology, North Carolina State University and President Conserva Inc.; Linda George, Associate Professor Medical Sociology and Senior Fellow, Center for the Study of Aging and Human Development, Duke University; David Peterson, Professor and Director, and Sally Coberly, Research Associate, Andrus Gerontology Center, University of Southern California. A similar review of chapter 4, "The Prospects for Living Longer," was performed by Leonard Hayflick, Professor and Director, Center for Gerontological Studies, University of Florida.

Reviews of a draft of the entire report were conducted externally by N. Alan Sheppard, Dean, College of Education, Morgan State University; and Michael Sugarman, Professor of Education, University of Akron. Internal reviews were conducted by Joel Magisos, Associate Director of International Programs at the National Center, and Herbert Parnes, Professor Emeritus of Economics, The Ohio State University, while a Visiting Scholar at the National Center. The final editorial review was performed by Sally Whittier and Deborah Anderson.

On behalf of the National Center I am pleased to express our appreciation to all who contributed to this report and the hope that the information they have provided will lead to better vocational education policies and programs for the elderly.

Robert E. Taylor
Executive Director
The National Center for Research
in Vocational Education

EXECUTIVE SUMMARY

This report contains a brief overview of the environment in which vocational education will operate in coming years and an extended analysis of a major influence upon that environment, the aging population. Previous reports from this project that have examined the general environment and other major influences are listed in appendix A.

The Environment

The forces identified in the first report of this project as the main determinants of the future environment for vocational education included: (1) the changing mix of students, (2) technological change, (3) competing requirements at the secondary level, and (4) a continuing emphasis in Federal legislation on increasing access to education opportunities. Two years later these still appear to be dominant. Of the four, technology, primarily in the form of microelectronics, is having the most influence throughout the economy and society. Applications of microprocessors are changing the nature of work in the factory and the office and have comparable potential for the home and the school.

The major uncertainty about the future involves the soundness of the economy. Stock market indices, Federal deficits, and trade imbalances are all at record highs. The economy is clearly in a time of transition, but economists differ on whether these conditions will lead to a major economic decline or instead are the first stages of a prolonged period of prosperity based primarily on applications of microelectronics.

The educational reform movement can be interpreted as a broad, grassroots response to the fundamental changes the Nation is undergoing. People may not understand why the changes are happening or quite how to respond to them, but they want their children to be as well prepared for this unknown future as they can be. Hence the calls for excellence in secondary education.

The main impact of the reform movement on secondary-level vocational education has been to push it away from occupationally specific training and toward more general goals. Three States, however, have decided to emphasize placement in training-related jobs as the primary criterion for evaluating secondary programs. The Committee for Economic Development (1985) has also recommended that vocational programs teach skills "that relate to the real needs of the job market." Thus while the traditional function of vocational education is still being supported, the major thrust at the secondary level is toward a broader concept that emphasizes reinforcement of basic skills and the teaching of

employability skills in an occupational context. This thrust appears likely to be dominant in coming years.

The Aging Population

One of the major influences on the environment in which vocational education operates is the aging of the population, particularly the increased number of people past the normal retirement age. This project examined projected increases in this age group and their attitudes toward work and retirement to determine if there is a need for more or different types of vocational education services for them. The major findings are as follows:

- The number of people 65 and older will increase more slowly in the next 25 years than it has in past periods. This is primarily due to the low number of births during the Great Depression and World War II.

- Because of improvements in working conditions, health care and pension plans since World War II, those over 65 and those who will reach that age this century will be healthier and more financially secure than previous generations of the elderly.

- There is little likelihood of medical advances that would lead to sizeable increases (5 years or more) in the life expectancy of the elderly in this century. Even eliminating cancer would add only about 2 years to the life expectancy of those 65 and over.

- Significantly proportion of those approaching age 65 express interest in working, usually on a part-time basis, after that age.

- Labor force participation by males 65 and older and even those 55 and older has been steadily declining.

These findings suggest that those among the elderly who are most likely to want and need vocational training are the poor and near-poor. Many older people with adequate savings and pensions do not wish to work. Older people who have skills needed in the labor market and who wish to work do not need training. It may be necessary to modify employers' attitudes toward the elderly or their employment practices to provide opportunities for these people, but that is not the role for vocational education.

The role that appears most appropriate is to serve those who wish to work, but who lack skills. Many of these people are

likely to be economically disadvantaged. Under the Job Training Partnership Act (JTPA), Section 124 directs 3 percent of Title II-A funds toward disadvantaged individuals 55 and older. (The Carl D. Perkins Vocational Education Act also authorizes, under Section 417, model centers for vocational programs for those 55 and older, but funds have not been appropriated). The need and the most appropriate role for vocational education converge on programs for the disadvantaged elderly. Vocational educators could well assist their employment and training counterparts to focus their combined efforts on implementing and enhancing the activities authorized under section 124 of JTPA.

If significant labor shortages develop, however, there is likely to be much more demand for vocational training among older people. Such shortages would cause changes in the attitudes and practices of employers that would encourage older people to continue working or to re-enter the work force. Vocational education could also assist employer to retrain or upgrade older workers who wished to continue working.

The more distant future, after the year 2010, is more difficult to anticipate. One thing is certain, however, the number of older people will begin to increase dramatically. Unless the productivity of the working population increases sharply--and workers are willing to share many of the benefits of this increase with retired persons--it seems that larger proportions of older people will have to work. Vocational educators will need to monitor these trends to determine appropriate responses.

CHAPTER 1

THE ENVIRONMENT FOR VOCATIONAL EDUCATION

This is the final report of a 3-year project designed to anticipate the environment for vocational education in coming years. Appendix A presents the conceptual model that has been used in this project and lists the five previous reports, the journal articles, and the professional presentations that have been based on this project. This report presents an overview of developments during 1985 that are judged to have significance for the future of vocational education and presents a detailed examination of a major demographic force--projected increases in the number of older individuals. Information on the number and condition of older people is presented together with an assessment of the probability of significant increases in life expectancy.

Since each report from this project has been concerned with the future, it may be useful to re-examine the major forces that were identified in 1983 as likely to influence vocational education during the remaining years of this decade:

- o Students. A gradual decrease in the number of secondary students; proportionately more minority and disadvantaged students at all levels; many more adult students with widely varying characteristics at the postsecondary level

- o Technological change. Rapid rates of technological change, making it virtually impossible to keep institutional equipment and curricula up-to-date

- o Competing requirements. Decreased time for vocational instruction at the secondary level because of increased requirements in English, mathematics, and science

- o Federal emphasis. A continuing emphasis in Federal vocational legislation on facilitating access to educational opportunities

Two years after these forces were identified, they still appear to play the major roles in shaping the environment for vocational education. The Carl D. Perkins Vocational Education

Act (P.L. 98-524), which was passed in 1984, continues and even strengthens the Federal role in facilitating access. This act requires that 57 percent of each State's basic grant be spent on 6 separate special needs populations. Technological changes, primarily those involving applications of microelectronics, continue at an accelerating pace. The amount of class time during the school day for vocational education and the number of secondary students have begun to decline. The American Vocational Association polled a nationwide sample of 91 high school vocational teachers and found four out of five reported that time for their courses had decreased (Hooper 1985a). Two out of three also said their enrollments had declined. Many educators are concerned that the new standards for secondary education set by virtually all the States may increase the drop-out rate (McDill and Natriello 1985).

As often happens in our society, when a strong thrust develops in one direction, a countervailing force arises to reflect the views of those who feel their interests are not represented by the dominant movement. So it is with the current emphasis on educational reform. The initial thrust for excellence and increased rigor in secondary education was seen as ignoring young people who have the most problems in school and concerns for these students began to be expressed.

The Association for Supervision and Curriculum Development (Currence 1985), the National Coalition of Advocates for Children (1985), and the Education Commission of the States (1985) all have warned of the educational, economic, and social dangers of ignoring the problems and needs of a sizable proportion of young people. These are the ones who cannot or will not meet the increased academic standards and may, in the words of the Education Commission of the States, "become disconnected" from society at large. The results of this disconnection are reflected in teenage unemployment, pregnancy, suicide, crime, and drug and alcohol useage. To prevent such problems, the reports recommend increased assistance to potential dropouts and other at-risk youth including more individualized instruction, maintaining curriculum options, and greater involvement of the business community through mentoring and providing opportunities for positive employment experiences.

The pressure on secondary vocational education from the education reform movement has been pushing it away from specific occupational training and toward general educational goals. This year saw the appearance of a policy statement from the Southern Regional Education Board (1985) that reinforced this pressure. The introduction to this statement presents the rationale for the redirection of secondary vocational programs:

> Basic academic competencies in communication, computation, and applied science are fundamental to preparing young people for further learning as well as for immediate employment upon high school graduation.
>
> While mastery of fundamental skills is essential for everyone, educators are faced with diversity of ability levels, interests and future plans among high school students. Vocational education in the secondary school curriculum can be important in addressing this diversity among students.
>
> Vocational education can make a vital contribution to an upgraded secondary school curriculum if it is improved and refocused so that the development of basic academic skills is a high priority. (pp. 2-3)

The vocational education community, at least as reflected by the work of the National Commission on Secondary Vocational Education (1984), appears to have accepted a position close to that recommended by The Southern Board. The report of this commission, The Unfinished Agenda, states that the potential of vocational education as an "educational process has not received the degree of attention it deserves. Vocational education's potential to respond to diverse learning styles has been underutilized" (p. 4). In its curriculum recommendations the commission advocates that:

> Secondary vocational education should provide instruction and practice in the basic skills of reading, writing, arithmetic, speaking, listening, and problem-solving. This addresses the current demand for the new basics without locking all students into the academic classroom. (pp. 25-26)

The commission further recommends that students be allowed to satisfy some graduation requirements in basic skill areas with vocational courses "that are comparable in content coverage and rigor" (p. 25).

Thus, the educational reform movement is pushing secondary vocational education toward broader goals. It is ironic, therefore, that in three States laws or proposals stemming from this reform movement are pushing secondary programs toward occupationally specific preparation. Florida and South Carolina have passed legislation and Pennsylvania has a proposal to tie funding of vocational programs to the placement rates of their graduates (Hooper 1985b). Programs that do not achieve the specified rates will receive reduced or no State funds. The South Carolina and Florida legislation are written slightly differently but both require related placement rates of 50 percent or higher while

allowing for participation in continuing education or military service.

Another influential voice calling for more targeted occupational preparation is the Committee for Economic Development (1985). This group is made up of top executives from many of the Nation's leading corporations and institutions of higher education. Its report, Investing in Our Children, received extensive media coverage and was cited by Governor Thornburgh in his proposal for placement criteria in Pennsylvania. The report has been characterized as extremely negative toward vocational education. The main targets of its criticism, however, are the basic skills of vocational students. The committee recommends that students not be allowed to enter vocational programs until they "demonstrate sufficient grounding in academic skills." Those who are allowed to enter should learn "skills that relate to the real needs of the job market" (p. 17). These real needs refer to up-to-date training in specific occupational areas.

This push and pull is inherent in a democratic society with a heterogeneous population. Each of the major groups in this society strives to use the mechanisms of government to advance its own interests. In such a society, the future is not so much planned as it is negotiated. Perhaps the most surprising aspect of the current reform movement is the unanimity of the support for more rigor in secondary education. Forty-eight States do not increase their high school graduation requirements in less than a 2-year period (Bridgeman 1985) without such unanimity.

The Economy

All of this activity and debate reflect a fundamental concern with the kind of education young people need for a future that seems certain to be a time of rapid change. The economy of the United States is always undergoing change, but in recent years the pace has accelerated. In the first half of the 1980s we have seen the deepest recession since the Great Depression and the second highest rate of economic growth since World War II. At present the United States is simultaneously experiencing record Federal deficits and trade imbalances while the stock market indices have reached new highs. If deficits and trade imbalances are bad for the economy, why are investors pushing the price of stocks to record highs? Some economists (e.g., Bergsten 1985) see the answer to this paradox in the overvalued U.S. dollar. Bergsten states that economic analysis shows the dollar is overvalued by about 40 percent. This means all imports are subsidized by this percentage and all exports are taxed a similar amount. Under these conditions, even our most efficient industries, like agriculture, cannot compete effectively in world markets. The dollar is overvalued primarily because the Federal

deficit keeps interests rates high and attracts investment from foreign countries. During 1985, the United States became a debtor nation, owing more to other countries than is owed to us, for the first time since the turn of the century. How long can the economy continue to grow under these conditions?

In January 1985, Future Survey, a monthly abstract service of the World Future Society, published 27 abstracts of articles and books on future directions of the U.S. economy. Most of these publications were written for the general public, not for a professional audience. Of the 27, 8 were optimistic or cautiously optimistic concerning the prospects for the near future; 12 were generally negative; and 7 analyzed conditions without making projections. Of the 12 negative projections, 7 called for major change in what are perceived as inherent weaknesses in the present system.

Much of this uncertainty arises from various signs that the economy appears to be at a major turning point. Several analysts have confirmed the long-wave economic cycles first documented by the Russian economist Kondratieff. A cycle typically begins when the economies of the major industrialized nations are at a low point characterized by business failures, debt default, and widespread unemployment. During such a period, Mensch (1979) hypothesizes investors seeking new opportunities are more willing to provide capital for innovations made possible by the application of new technologies. These investments lead to economic growth and a prolonged period of prosperity. During the mature stage of a cycle, however, excess capacity to deliver the dominant technologies accumulates, and most investment is in minor modifications of these technologies. These conditions lead to economic stagnation and provide the conditions for another set of innovations which stimulate new investment and begin a new cycle.

Such a cycle typically takes 45 to 60 years. All long-wave analysts consider the Great Depression of the 1930s to have been a major low point, which was followed by the postwar prosperity that lasted until the early 1970s. These analysts differ on whether the 1979-82 recessionary period was a low point that will be followed by prolonged economic growth or instead was a precursor of a much more serious economic downturn.

If the pessimists are correct, no projections can be made with any sense of confidence. An economic decline of the magnitude of the 1930s would in all likelihood bring about fundamental change in the economic institutions of our society. For what consolation it provides, 10 eminent economists who have been polled since the late 1970s by The Wall Street Journal (12 October 1984, p. 1) have all consistently rejected the likelihood of a major collapse. These economists include three Nobel

laureates and two former chairs of the Federal Reserve Board. They cite such factors as unemployment insurance, the greater stability of jobs in service industries, and the increased information available on the status of the economy that would facilitate corrective action.

If the optimists are correct, the Nation is in the ascending period of a new long wave. The number of new businesses being started and the application of microelectronic technology in a wide variety of settings are evidence for the positive view. High levels of debt and weaknesses in many of our basic industries argue for the negative view. Whichever view is taken, it is clear the economy is in a time of transition. Such a transition means new skills will be needed in the work force, and vocational educators must increase their efforts to identify these new needs and respond to them.

Technology

If the economy is in the ascending phase of a new long wave, certainly the dominant technology of this wave will be microelectronics. While diffuse and unfocused, there is a pervasive awareness of the importance of this technology. Witness, for example, the repeated calls that young people should be taught computer literacy. Those who issue such calls would be hard pressed to define just what computer literacy involves. With the technology changing so rapidly, a standard definition is probably neither possible nor very useful. Nevertheless, the concern about microelectronics reflected in these calls is useful. Whatever shape the future takes, microelectronics will be a primary, perhaps the primary, driving force.

The application of microelectronics that causes the most speculation and apprehension is factory automation. A popular image of the factory of the future is one of row upon row of robots controlled and maintained by a handful of engineers and technicians. This image naturally leads to fears of massive unemployment. While such fears are understandable, existing evidence suggests they are unfounded.

In 1985 the Society of Manufacturing Engineers published a new Delphi study (Smith and Heytler) that projects usage of industrial robots to 1995. The respondents in this study anticipate major increases in usage and the displacement of many workers, but few of those displaced, 6 percent, are expected to become unemployed. Instead the respondents project that most displaced workers will receive lateral transfers to jobs requiring similar skill levels.

One may view these forecasts with some skepticism since the respondents to this survey are the individuals responsible for introducing robots into their companies. Few people like to think of their own work as causing the disruption of lives and unhappiness that often accompanies unemployment. The natural human tendency to see one's own action in the most favorable light could easily lead to overly optimistic projections. It is of interest, therefore, that an extensive and sophisticated economic analysis of the impact of automation on employment from 1963 to 2000 reached much the same conclusion. Leontieff and Duchin (1984) used an input-output model of the entire U.S. economy to test the probable effects of different rates of adoption of computer-based automation. They estimated that large increases in the use of robots would directly reduce the demand for operatives and laborers by about 400,000 in 1990 and almost 2 million in 2000, but the proportion of the work force in these categories would change very little:

> Production workers can be expected to maintain their share of the labor force; direct displacement by specific items of automated equipment (like robots and numerically controlled machine tools) will, at least in initial stages, be offset by the increased investment demand for all sorts of capital goods, especially computers. (Leontief and Duchin 1984, p. 2)

The Leontief-Duchin analysis yielded another conclusion very similar to one from the Delphi study of the Society of Manufacturing Engineers: the need for a better educated work force. There has been much debate on whether the net effect of advanced technology is to increase or decrease the level of skills needed in the workforce. The arguments have been discussed in previous reports of this project and will not be repeated here. It will be noted, however, that these two studies and an examination of the effect of office technology on clerical skills (Rajan 1985) provide scant support for the deskilling position. Rajan's two general conclusions are worth repeating.

> First, the debate on whether new technology has deskilled clerical tasks in retail trades and financial institutions is not easy to settle. One's judgment depends on how much subjective weight is attached to the loss of job-specific skills, on one hand, and the consequent job enlargement and enrichment on the other. Second, in the final analysis, the impact on skills depends on how the change is managed and not on the inherent features of new technology. (p. 413)

One type of deskilling that is eagerly anticipated is the elimination of keyboard skills by a talkwriter--a machine that can transcribe speech. There is probably no development that

will make a personal computer more accessible, especially to the millions of managers, professionals, and technicians whose main function is using and creating information but who lack typing skills. Major efforts are under way in both the United States and Japan to develop talkwriters. IBM has an experimental device that can understand 5,000 words (Petré 1985). The Japanese Fifth Generation Computer Program hopes to develop a "phonetic typewriter" that can respond to 10,000 words by 1991 (Zeman 1985). All existing systems have cost and technical constraints--such as the need to "train" the computer to understand each user--that limit their commercial feasibility. Experts predict it will take another 10 to 20 years to develop truly flexible systems that can be sold at a price low enough to replace human skills with a machine.

If computer users will need keyboard skills for at least the next 10 years, should they be taught the standard keyboard or the more efficient Dvorak design? The standard keyboard, sometimes called QWERTY from the arrangement of the third row of left-hand keys, was purposely designed to slow fast typists who jammed the old mechanical typewriters. With the new electric typewriters and computers, jamming is not a problem. Business and office educators have been aware of the Dvorak keyboard, but until recently they have had to teach students to use the existing standard machines. Some of the new personal computers give the option of using either keyboard.

While educators now have an option, it is likely that the standard keyboard will continue to dominate. Computers with the optional keyboards will comprise a small fraction of the total stock for several years. By the time a large number of models with optional keyboards are available, talkwriters are also likely to be available making the choice of keyboards moot. At present there is little evidence of any real attention being directed to the issue. A recent study on the uses of computers in education (Education Turnkey Systems 1985) did not address this issue and there was only one article (Flatey 1985) on the topic in the major business education journals during the past year.

Microelectronics is affecting far more than the factory and the office. In May 1985, the IEEE Spectrum, a publication of the Institute for Electrical and Electronic Engineers, devoted a special issue titled "At Home with High Technology" to forthcoming changes in the design of basic systems for private homes, such as heating, communication, and lighting, that will be possible with new technology. The developments discussed make clear the pervasive nature of microelectronics. The average home has approximately 50 electric motors--in appliances, clocks, tools, and communication equipment--that can be replaced or improved with microelectronic devices. Most of these changes

will not be perceptible to the user, except for the enhanced capacity and reliability of the systems that incorporate these devices. But new skills will be required of those who design, manufacture, and maintain these systems.

The generic nature of microelectronics argues for a basic understanding of its principles among all workers and consumers. The Right Honorable Shirley Williams, former Secretary of State for Education and Science in Great Britain stated the need for such an understanding as follows:

> Because microelectronics is capable of being applied to all goods and services, the extent of its use will not be determined by its technical relevance, but by awareness of its potential. The education level of the working population is therefore likely to determine the speed and extent of the adoption of information technology. (Williams 1985, p. 24)

The education reform movement can be interpreted as a response to a diffuse, general awareness that our Nation is undergoing basic structural changes in its economy. These changes are being caused by both international competition and technology, but if Mensch's (1979) analysis of the role of technology is correct, those nations that best capitalize on the potential of microelectronics will be dominant.

Vocational education's role in education reform and in retraining the adult work force is now being debated in a variety of forums. It seems almost axiomatic, however, that the major public enterprise concerned with the preparation of people for employment must play a significant role. The challenges to vocational educators at all levels are to keep aware of the changes taking place in those portions of the labor force they serve and to try to keep programs responsive to these changes. There are no pat answers on how this can be done, but certainly a sensitivity to the environment in which programs operate is essential.

The Aging Population

One of the major forces in this environment is the aging of the population. The remainder of this report examines projections of the number of individuals 65 and over, their health, economic status, and attitudes toward work and retirement. The prospects of significant increases in life expectancy are also examined. The report then assesses whether there is likely to be a need for expanded vocational education opportunities for the elderly in coming years.

This focus on the 65 and older population arose from two considerations: the increasing number of older people due to their lenghtening life expectancy and the potential of even more dramatic increases in coming years. If significant increases in life expectancy of the elderly were likely in the near future, the strains upon both public and private retirement systems would be even greater than those presently anticipated. If the elderly were to live even 5 years longer, on the average, it would be a virtual necessity for most people to continue their working life beyond the normal retirement age. For men, the average age of retirement has been steadily declining in the past three decades. The Social Security Amendments of 1983 (P.L. 98-81), however, retain 65 as the age for retirement with full benefits until the year 2000. Therefore, for this report, age 65 and above was used as the definition of elderly.

It is recognized that this definition excludes workers in the 50 to 65 age range who often must make job changes and frequently experience age discrimination in the labor market. In a time of rapid structural change in the economy, many workers in this age range are likely to be displaced from their current jobs and need retraining for continued employment. The problems of these older, displaced worker are not, however, discussed in this report, which focuses on individuals 65 and older.

CHAPTER 2

POPULATION PROJECTIONS, HEALTH, AND ECONOMIC STATUS OF THE ELDERLY

This chapter describes trends among the aged population of the United States in the areas of demographics, health status, health care expenditures, income status and economic resources. The status of the current elderly population is presented and contrasted with the status of prior elderly populations for the purpose of identifying the differences and similarities between the groups over the past several decades. Projections regarding the status of the aged population over the next several decades are also provided as a means of looking at how future elderly populations arel likely to be different from or similar to the current aged population.

Among the demographic characteristics included in the discussion are the number and percentage of elderly persons in the population, gender composition of the older population, marital status and living arrangements, and educational attainment. The health status and health care expenditures discussion includes descriptions of chronic conditions, utilization of health care services, health care costs, and the relationship between life expectancy and health status. The section on income status and economic resources presents a discussion of family and individual income, poverty status, expenditure and tax advantages, and the sources of income, including social security, earnings, asset income, pensions, public assistance, and in-kind income. Most of the data in this chapter are from a report by the U.S. Bureau of the Census (1984a) that integrated several sources of data produced by that agency.

Demographic Characteristics

Number of Elderly Persons

The aged population of the United States has steadily increased both in number and as a percentage of the total U.S. population since 1920 and is projected to continue increasing until at least the middle of the next century. In 1980, the aged population (those persons 65 years and older) of the United

States numbered 25.7 million persons (see table 2-1). The number of aged individuals in the United States is expected to increase to about 35 million by the year 2000, to roughly 51.4 million by 2020, and to approximately 64.3 million by 2030. In 1970, approximately 1 person in 10 was aged (9.9 percent). By 2030, it is projected that the aged will comprise roughly 1 out of every 5 persons (21.1 percent) in the United States.

The greatest actual and percentage decennial increases in the 65-and-over population during the next 70 years are expected to occur between 2010 and 2020 (12.1 million persons and 30.9 percent increase) and between 2020 and 2030 (13 million persons and 25.2 percent increase). The tremendous increase in the aged population during this 2010-30 period will be largely due to the entry and eventually the inclusion of the entire post-World War II baby boom generation into the ranks of the aged. It is during these decades that the number of aged persons relative to the non-aged population will also increase most dramatically. From comprising 13.9 percent of the total U.S. population in 2010, the aged are expected to comprise 17.3 percent of the total population by 2020 and 21.1 percent by 2030.

After relatively substantial decennial increases in the 65-and-over population between 1970 and 1980 and between 1980 and 1990, decennial increases in the aged population are expected to be modest between 1990 and 2000 and between 2000 and 2010. These are the decades when the people born during the Great Depression and World War II will become 65. Once the baby boom generation has been completely assimilated into the ranks of the aged, the decennial increases in the 65-and-over population are expected to be slight between 2030 and 2040 and between 2040 and 2050.

As the baby boom generation enters the ranks of the 75-and-over population starting in 2020 and the 85-and-over population starting in 2030, these age groups will exhibit fluctuations in decennial growth rates similar to those of the 65-and-over population after 2010. The elderly population itself has been growing increasingly older since 1950 (see table 2-1 and 2-2) and will continue to do so until 2010 when the beginning of the influx of the baby boom generation into the 65-and-over population will reverse the trend. This trend, however, will not last for long. As the baby boom generation begins to join the 75-and-over population the trend will once again be toward the aging of the elderly population, a trend that will continue through 2050, according to Census Bureau projections.

TABLE 2-1

POPULATION IN THE OLDER AGES AND DECENNIAL INCREASES BETWEEN 1960 AND 2050

Age		Year									
		Actual			Middle Series Projections						
		1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
65 years and over	Number (thousands)	16,675	20,087	25,708	31,799	35,038	39,269	51,386	64,344	68,642	67,032
	% of total population	9.3	9.8	11.3	12.7	13.1	13.9	17.3	21.1	21.8	21.7
	% decennial increase	34.5	20.5	28.0	23.7	10.2	12.1	30.9	25.2	3.8	0.8
75 years and over	Number (thousands)	5,621	7,800	10,081	13,745	17,343	18,990	21,617	29,929	37,475	37,088
	% of total population	3.1	3.7	4.4	5.5	6.5	6.7	7.3	9.8	12.2	12.0
	% decennial increase	44.0	35.2	32.4	36.8	26.2	9.5	13.8	38.5	25.2	-1.1
85 years and over	Number (thousands)	940	1,432	2,274	3,481	5,138	6,818	7,337	8,801	12,948	18,083
	% of total population	0.5	0.7	1.0	1.4	1.9	2.4	2.5	2.9	4.2	5.8
	% decennial increase	58.3	52.3	58.8	52.2	48.4	32.7	7.6	20.0	47.1	24.1

SOURCE: U.S. Bureau of the Census, (1984a) Table 2-1, p. 15.

BEST COPY AVAILABLE

TABLE 2-2

PERCENTAGE DISTRIBUTION OF THE POPULATION 65 YEARS AND OVER BY AGE BETWEEN 1960 AND 2050

(Percentage of All Persons 65 Years and Over)	Year									
	Actual			Middle Series Projections						
Age	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
65-74 years	66.3	62.2	60.8	58.8	50.5	51.7	57.9	53.5	43.8	44.7
75-84 years	28.1	30.7	30.3	32.4	34.9	31.0	27.8	32.8	36.8	31.3
85 years and over	5.6	7.1	8.8	10.9	14.7	17.4	14.3	13.7	19.4	24.0

SOURCE: U.S. Bureau of the Census (1984a) Table 2-6, p. 17.

Three factors contribute to the size of the older population: fertility (birthrates), mortality (death rates), and immigration (net immigration rates). The general decline in the birthrate since the mid 1960s has been the principal reason for the increase between 1960 and the present in the proportion of persons in the total population who are 65-and-over (Bureau of the Census 1984a). Most demographers expect fertility levels will remain low enough for the next 50 years to continue the aging of the population in the United States.

A decline in death rates since 1960 has also contributed to the increase in the proportion of aged persons in the total population, but its effect on the increase has been less than that of the decline in the birthrate. Declines in death rates do not necessarily cause a rise in the proportion of older persons but do so only if the declines are concentrated at older ages (Coale 1956). In the period since 1968, improvements in survival rates for the older population have exceeded those for the younger population and hence have been contributing to the aging of the population (Bureau of the Census 1984a). Because of the relatively low level of mortality at the ages below 50, future substantial reductions in mortality in the United States can occur only at the ages above 50. The question is whether these reductions will occur, and if so, how substantial they will be. It is expected that death rates at the older ages will continue

to decline; however, their rate of decline is open to much speculation. Chapter 4 examines this issue in more detail.

Immigration operates like mortality in its effect on age composition, that is, it tends to reduce the proportion of older persons unless the migrants are concentrated in the older ages (Bureau of the Census 1984a). An analysis by Hermalin (1966) on population growth and age distribution in the United States between 1900 and 1960 found that, in fact, immigration during this period led to a younger, and not an older, U.S. population. The general falling-off of immigration since World War I has led to a minimal effect of this factor on U.S. population aging, although a recent shift in the direction of increasing immigration may cause it to become more influential.

Gender Composition of the Older Population

Due to the increased life expectancy of females, the elderly population has a greater percentage of females than males and will continue to in the future. In fact it is projected that the proportion of females in the older population will increase until at least 2000 (see table 2-3). Sometime during the decade between 2000 and 2010, it is expected that this trend will begin to reverse slowly, with the percentage of males in the older population projected to increase from that point until at least 2020.

The tendency for the older population to be disproportionately female is even more pronounced in the oldest age group--those persons 85 years and over. Whereas the older population as a whole was 60 percent female in 1980, the 85-and-over population was 70 percent female. The proportion of females in the 85-and-over age group is projected to continue rising until at least 2020, although the rate of increase is projected to stabilize between 2010 and 2020.

Marital Status and Living Arrangements

The higher mortality rate among older men is the major contributing factor to very different marital status and living arrangement patterns between elderly males and females. The majority of elderly males (74.1 percent in 1981) were married and living with their spouse (see tables 2-4 and 2-5). The majority of elderly females, on the other hand, were either widowed, divorced, separated or single (62 percent in 1981). Whereas 13.8

TABLE 2-3

FEMALE PERCENTAGE OF THE OLDER POPULATION

	Year			Middle Series Projections			
Age and Sex	1960	1970	1980	1990	2000	2010	2020
Percentage female 65 and over	54.8	58.1	59.7	60.2	60.8	60.5	59.1
85 and over	61.1	65.3	69.8	72.1	72.9	73.4	73.5

SOURCE: U.S. Bureau of the Census (1984a) adapted from Table 3-1 p. 25.

percent of the elderly males lived alone in 1981, almost 40 percent of the elderly females lived alone.

The gap between married males living with their spouses and unmarried females is even more pronounced among those 75 and over. Sixty-five percent of the males 75 and over in 1981 were and living with their spouses, compared to a figure of only 19 percent for females 75 and over. Projections to 1995 indicate a relatively similar marital status pattern to that of 1981. The percentage of older persons who are married is expected to decline by 1.5 to 2 percentage points for males and females. Among those 75 and over, males are projected to show a slight increase in the percent married, whereas females are projected to show a slight decrease.

The percentage of elderly females living alone increased substantially between 1965 and 1981 and was even more pronounced among females 75 and over. A major reason for this increase is apparently a marked decrease in the tendency of widowed females to move in with one of their children or another relative (e.g., a sister). These women instead increasingly tend to maintain their own households and live independently. Whether the trends described regarding marital status and living arrangements will continue will depend on the stability or change in attitudes regarding marriage, divorce, and living together; the prospects for reducing mortality in later life; and the prospects for the convergence of male and female death rates (Bureau of the Census 1984a).

TABLE 2-4

MARITAL STATUS OF THE OLDER POPULATION BY SEX BETWEEN 1965 AND 1995

Year	Marital Status	65 and Over		75 and Over	
		Male	Female	Male	Female
	Single	6.8	7.7	7.6	8.0
1965	Married, spouse present	67.9	34.1	54.0	19.0
	Widowed, divorced or separated	25.5	58.2	38.4	73.0
	Single	4.5	5.7	3.5	6.2
1981	Married, spouse present	77.0	37.8	69.7	21.8
	Widowed, divorced or separated	18.5	56.5	26.8	72.0
Projection					
	Single	5.1	5.3	4.7	5.4
1995	Married, spouse present	75.6	35.9	70.9	20.5
	Widowed, divorced or separated	19.3	58.7	24.5	74.2

SOURCE: U.S. Bureau of the Census (1984a) Table 7-2, p. 94.

TABLE 2-5

LIVING ARRANGEMENTS OF THE OLDER POPULATION BY SEX BETWEEN 1965 AND 1981

Year	Living Arrangement	65 and Over		75 and Over	
		Male	Female	Male	Female
	Living alone	13.1	28.6	15.7	29.9
1965	Living w/spouse	67.9	34.1	54.0	19.0
	Living w/other(s)	15.2	32.6	23.9	43.1
	Not in household	3.8	4.7	6.4	8.0
	Living alone	13.9	38.8	19.0	45.1
1981	Living w/spouse	74.1	35.5	64.8	19.3
	Living w/other(s)	8.3	19.4	9.1	23.8
	Not in household	3.8	6.3	7.1	11.7

SOURCE: U.S. Bureau of the Census (1984a) Table 7-3, p. 95.

Educational Attainment

The level of educational attainment has been increasing steadily for the adult population 25 and over (see table 2-6) from a median of 11 school years completed in 1959 to 12.2 years in 1970 to 12.6 years in 1985. It is projected that by 2000, 64 percent of the aged population will have graduated from high school compared with the current figure of 46 percent.

TABLE 2-6

EDUCATIONAL ATTAINMENT OF THE POPULATION 65 YEARS AND OVER AND 25 YEARS AND OVER BETWEEN 1959 AND 2000

Year	Median School Years Completed			Percent High School Graduates		
	65 Years and Over	25 Years and Over	Ratio of 65+: 25+	65 Years and Over	25 Years and Over	Ratio 65+: 25+
1959	8.3	11.0	0.75	19.4	42.9	0.45
1970	8.7	12.2	0.71	28.3	55.2	0.51
1985	11.3	12.8	0.90	48.2	72.3	0.84
Projection 2000	12.4	12.8	0.97	63.7	80.4	0.79

SOURCE: U.S. Bureau of the Census (1984a) Table 7-12, p. 99.

Since 72 percent of the adult population currently has attained a high school education, with a projected figure for 2000 of 80 percent, the trend toward increased educational attainment among the older population can be expected to continue beyond 2000.

Health Status and Health Care Expenditures

At the beginning of this century, the most prevalent health problems of the elderly were acute; today, the most prevalent health problems are chronic, and the likelihood of having a chronic illness or a disabling condition increases dramatically with age (Congressional Clearinghouse on the Future 1984). The incidence of acute conditions among the elderly in 1978 (111 per 100 persons) was actually less than for the population under 65 years of age (232 per 100 persons), although the older population had a disproportionate number of restricted activity days as a result of these acute conditions (1,207 days per 100 persons compared to 948 days per 100 persons under 65) (Bureau of the Census 1984). These figures indicate that elderly persons require longer periods of time to recuperate from their acute

illnesses and infirmities than do younger persons, or that the types of acute illnesses and injuries that afflict the elderly require longer periods of recuperation than the types of illnesses and injuries experienced by younger persons or both.

Chronic Conditions

The elderly are much more likely than younger persons to have chronic conditions that limit their activities. In 1978, 45 percent of persons aged 65 and over were limited in their activity as a result of a chronic condition, while only 10.5 percent of those under age 65 were similarly afflicted (Bureau of the Census 1984a). Within the aged population, those elderly persons 75 and over are more likely than those between 65 and 74 to be limited by chronic conditions (see table 2-7). In 1980, almost 50 percent of those 75 and over were limited, compared with 38 percent of those between 65 and 74.

The percentage of aged persons experiencing limitations in activity due to chronic conditions is projected to increase only

TABLE 2-7

LIMITATION IN ACTIVITY DUE TO CHRONIC CONDITIONS FOR THE OLDER POPULATION BY AGE BETWEEN 1980 AND 2040

		Year						
		Actual	Projections					
Age	Number and Percent with Limitation	1980	1990	2000	2010	2020	2030	2040
65 +	Number (in millions)	11.0	14.5	16.5	18.5	23.75	30.0	32.0
	% of all those 65+	42.8	45.8	47.1	47.1	46.2	48.8	48.0
65-74	Number (in millions)	6	7.5	7	9	13	14.5	12
	% of all those 65-74	38.3	41.5	39.8	44.4	43.7	42.1	41.1
75 +	Number (in millions)	5	7	9.5	9.5	10.75	15.5	20
	% of all those 75+	49.7	50.9	54.8	50.0	49.7	51.8	53.4

SOURCE: Congressional Clearinghouse on the Future (1984) adapted from chart on p. 41.

about 5 percentage points between 1980 and 2040. In sheer numbers, however, the increase for those 65-and-over will be threefold (from 11 million persons in 1980 to 32 million persons in 2040), and for those 75 and over it will be fourfold (from 5 million persons in 1980 to 20 million in 2040).

Utilization of Health Care Services

The elderly utilized health care services at a much higher rate than the rest of the population. After early childhood, the average number of visits to physicians increases directly with age, and the rise accelerates in the older ages. Persons 65 years and over make an average of two more visits per person per year than those under age 45 (Bureau of the Census 1984a). The elderly also have much higher short-term hospital utilization rates than the rest of the population (see table 2-8). In 1979, the admission rate into short-term hospitals for aged persons was 354 per 1,000 population compared to a figure of 160 for the population as a whole. Furthermore, the average length of stay for an elderly patient was 3 days longer than for patients from the population as a whole.

While the admission rate into short-term hospitals increased for the population as a whole between 1970 and 1979 (a 14.3 percent increase), the increase was even greater among the aged (an 18.4 percent increase). The average length of stay per admission during this same period, however, decreased for the population as a whole (a 7.3 percent decrease), and the decrease was greater among the aged (an 18.5 percent decrease).

Most of the resident population in the Nation's nursing and personal care homes are elderly (see table 2-9). In 1977 they accounted for 86 percent of the resident population in these facilities, with those persons 75 and over comprising 70 percent (see table 2-9). This population is predominantly female and this predominance is even more pronounced in the older age group. Among females in nursing and personal care homes in 1977, 76 percent were 75 or over, compared to a figure for male residents of 57 percent who were 75 or older.

Health Care Costs

With their greater utilization of health care services than the rest of the population, the elderly account for a percentage of the Nation's health care costs that is out of proportion to their numbers in the population. Whereas in 1978 the elderly comprised about 11 percent of the population, they accounted for

TABLE 2-8

ADMISSION RATES AND AVERAGE LENGTH OF STAY IN SHORT-TERM HOSPITALS FOR THE TOTAL POPULATION AND THE POPULATION 65 YEARS AND OVER BETWEEN 1970 AND 1979

Admission and Length of Stay	Year		
	1970	1975	1979
Total population			
Admission rate[1]	140	156	160
Average length of stay (days)[2]	8.2	7.7	7.6
Population 65 and over			
Admission rate[1]	299	328	354
Average length of stay (days)[2]	13.0	11.4	10.6
Ratio of total to 65 and over			
Admission rate[1]	0.47	0.48	0.45
Average length of stay (days)[2]	0.63	0.68	0.72

[1]Number of admissions per 1,000 resident mid-year population.
[2]Number of inpatient days divided by number of admissions.

SOURCE: U.S. Bureau of the Census (1984a) Table 6-6, p. 82.

29 percent of the Nation's total health care bill (Bureau of the Census 1984a). Per capita expenditures for health care services generally increase with age, as does the use of health care service; in 1978, the health care expenditure per capita was $2,026 for those 65-and-over, compared to $597 for those under 65 (Bureau of the Census 1984).

TABLE 2-9

RESIDENTS IN NURSING AND PERSONAL CARE HOMES BY SEX
FOR VARIOUS AGE GROUPS BETWEEN 1964 AND 1977

Percentage of the Institutional Population by Sex	Year					
	1964			1977		
Male	35.0			28.8		
Female	65.0			71.2		
Percentage of the Institutional Population by Sex, Age	Year and Sex					
	1964			1977		
	Both Sexes	Males	Females	Both Sexes	Males	Females
Under 65	11.9	18.7	8.3	13.6	16.4	10.3
Over 65	88.1	81.3	91.7	86.4	83.6	89.7
- 65-74	18.9	20.9	17.8	16.2	21.3	14.1
- 75-84	41.7	38.2	43.5	35.7	32.5	37.0
- 85 and over	27.5	22.2	30.3	34.5	24.5	38.6

SOURCE: U.S. Bureau of the Census (1984a) Table 6-8, p. 83.

Per capita costs for personal health care for the elderly rose steadily from $472 in 1965 to $2,026 in 1978 (Bureau of the Census 1984). More importantly, the percentage of total income that elderly persons spend out of their own pockets on health care services has also risen since 1965 (Congressional Clearinghouse on the Future 1984). In 1984, the elderly spent an average of $1,526 (about 15 percent of their total income) per person (including Medicare premiums) on health care services. The percentage of total income that elderly persons spend on health care is expected to increase in the future (Congressional Clearinghouse on the Future 1984).

Most health care costs occur during the last 2 years of life, regardless of the age at death, and thus a very small group of elderly persons accounts for a large proportion of the expenditures; in 1980, 5 percent of the elderly accounted for 22 percent of elderly health care expenditures (Congressional Clearinghouse in the Future 1984). Three-fourths of the elderly spent less than $1,000 per person on health care in 1980.

Life Expectancy and Health Status

Evidence to date indicates that although life expectancy is increasing, the health status of the aged population is not improving (Bureau of the Census 1984a; Colvez and Blanchet 1981; Feldman 1982; Omran 1977). The shift in causes of mortality from infectious and parasitic diseases to chronic conditions exhibited since the turn of the century has also been witnessed for the causes of morbidity (Bureau of the Census 1984a). Thus, although people are living longer, the possibility for experiencing disability also increases. Feldman (1982) in fact reports that analyses indicate a strong connection between improvements in mortality and increases in disability. Thus, as Vladeck and Firman (1983) point out, increased numbers of frail elderly may well be a consequence of future biomedical breakthroughs in the treatment of acute illnesses.

Income Status and Economic Resources

Due to the way information on income is gathered and reported, it is difficult to obtain precise figures for the elderly in comparison to the rest of the population. Some of these difficulties are noted in the following secitons. Readers desiring a fuller discussion are referred to the U.S. Bureau of the Census (1984a) publication, Demographic and Socioeconomic Aspects of Aging in the United States pages 106-114.

Family and Individual Income

According to the Census Bureau, families with household heads aged 65 and over had considerably lower incomes ($12,965 per family) than families in general ($22,929 per family) in 1980. Because there is no denotation of the number of persons contributing to or sharing in these family incomes, however, no interpretation should be made regarding these statistics. The Census Bureau also calculates figures for individual income, which adjusts family income for the size of the family. This calculation significantly reduced the discrepancy between the incomes of aged families and families in general. The per person income of family members in households with the head 65 or older was $5,505 in 1980 compared to a per person income of family members in all families of $6,390.

Retired vs. Nonretired Elderly

An important factor in assessing the income status of the aged is the distinction between retired and nonretired elderly persons. The more serious economic problems of aging commonly

arise or are aggravated by the cessation of earnings following retirement (Schulz 1976). The median income in 1980 of a family headed by an elderly person who did not work was less than that for families headed by an elderly person who worked either full- or part-time (see table 2-10). The median income for a family maintained by an elderly person who worked full-time for more than half the year ($24,280) was more than twice that for a family maintained by an elderly person who did not work ($11,550).

The increasing rate of retirement among 55-64 year old males over the past 2 decades (discussed in chapter 3 of this report) has made it increasingly unsatisfactory, when discussing the issue of income, aging and retirement, to make a line of demarcation at age 65, placing those 65 and over in one group and those under 65 in another. Both Schulz (1976) and the U.S. Bureau of the Census (1984a) have noted the importance, in examining the income, aging, and retirement issue, of separating income data on those age 62-64 and those 60-61 or 55-61, because it is at age 62 that initial social security eligibility begins for everyone except widows, who can qualify at age 60.

According to Schulz (1976), data on persons who retire before age 62 indicate that this group tends to be composed of both very high-income people and very low-income people, with very few in the middle. The low-income people are those who have to retire (because of disability or forced retirement) even though they do not have many economic resources. The high-income people are those who can retire early because they have sufficient economic resources to live satisfactorily. Unfortunately, National data on income and retirement for these age groupings are not published and thus no exact figures or projections are available.

Poverty Status

The poverty rate among the aged population declined steadily between 1959 when it was 35.2 percent to 1975 when it was 15.3 percent, and has remained stable since then (see table 2-11). The measure of poverty status used in these data is the Social Security Administration's poverty index. This index is developed

TABLE 2-10

MONEY INCOME OF AGED HOUSEHOLDS BY EMPLOYMENT STATUS
OF THE HOUSEHOLD HEAD FOR 1980

Work Experience (1980)	Median Income (dollars)	Percent					
		Total	Less than $5,000	$5,000 to $9,999	$10,000 to $14,999	$15,000 to $24,999	$25,000 or more
Householder did not work	$11,550	100.0	9.3	32.0	24.8	21.7	12.3
Householder worked part-time							
26 weeks or less	$13,250	100.0	8.7	28.3	21.1	25.4	16.5
27-52 weeks	$15,978	100.0	3.5	19.4	23.5	30.3	23.3
Householder worked full-time							
26 weeks or less	$14,763	100.0	1.8	15.9	34.5	21.8	26.2
27-52 weeks	$24,280	100.0	1.3	7.8	13.8	29.3	48.2

SOURCE: U.S. Bureau of the Census (1984a) Table 8-8, p. 120.

by (1) the determination of the cost of an adequate amount of food for an average family unit (according to the U.S. Department of Agriculture); (2) a modification of this food budget for 62 different types of families, based on factors such as size of the family, age of the family head, and number of related children under 18, and (3) a multiplication of the food budget by the number 3, based on a survey of the ratio of food consumption to other expenditures of all families in the United States (Schulz 1976).

When analyzed by race, it can be seen that although the poverty rate for elderly whites has remained relatively stable since 1975, the poverty rate among elderly blacks increased in 1981 after a steady decline between 1959 and 1975. In 1981, the poverty rate among elderly blacks was three times that of elderly whites. Analyses by sex and living arrangements show that elderly females have a higher poverty rate than elderly males

TABLE 2-11

POVERTY RATES FOR OLDER PERSONS BY RACE, SEX, AND LIVING ARRANGEMENTS BETWEEN 1959 AND 1981

Race, Sex and Living Arrangements	Year				
	1959	1966	1970	1975	1981
All persons 65 years and over	35.2	28.5	24.6	15.3	15.3
Race					
Whites	33.1	26.4	22.6	13.4	13.1
Blacks	62.5	55.1	47.7	36.3	39.0
Sex and Living Arrangements					
In families headed by a male	29.1	20.9	15.9	8.3	8.0
In families headed by a female	28.8	20.4	20.1	12.7	14.8
Living alone or with unrelated others					
- Males	59.0	44.5	38.9	27.8	23.5
- Females	63.3	57.0	49.6	31.9	31.4
Race, Sex and Living Arrangements[1]					
Whites					
In families headed by a male	-	-	-	-	6.4
In families headed by a female	-	-	-	-	11.5
Blacks					
In families headed by a male	-	-	-	-	29.2
In families headed by a female	-	-	-	-	30.9
Living alone or with unrelated others					
White males	-	-	-	-	19.7
White females	-	-	-	-	28.2
Black males	-	-	-	-	46.0
Black females	-	-	-	-	64.3

[1]Data on race, sex, and living arrangements combined not available prior to 1981.

SOURCE: U.S. Bureau of the Census (1984a), Tables 8-7 and 8-8, p. 120.

and that elderly persons living alone or with unrelated others have a higher poverty rate than elderly persons living in families. These figures are particularly important when it is

and that elderly persons living alone or with unrelated others have a higher poverty rate than elderly persons living in families. These figures are particularly important when it is recalled that almost three-fourths of the elderly male population live with their spouses, and almost 40 percent of the elderly female population live alone. When race, sex, and living arrangements are combined, it can be seen that the lowest poverty rate among the elderly is exhibited by whites living in families headed by a male (6.4 percent), and the highest poverty rate is exhibited by back females living alone or with unrelated others. These black women have a incredible poverty rate of 64.3 percent which is 10 times that of whites living in families headed by a male.

Sources of Income

The sources of income for the aged population are divided into five categories for the purposes of this discussion: (1) Social Security, (2) earnings, (3) assets, (4) pensions, and (5) public assistance. The contribution of each of these sources to the income of the aged population and a projection of the expected contribution of these sources in the future are presented.

Social Security. Social Security is the largest single source of income for the elderly population in the United States. In 1981, Social Security accounted for 37 percent of the reported income of elderly persons (see table 2-12). According to Census Bureau figures on income sources for the aged in 1978, 16 percent of the elderly lived exclusively on social security benefits, and 26 percent obtained 90 percent of their income from Social Security (Bureau of the Census 1984a). The Congressional Clearinghouse on the Future (1984) reports that in 1981, 65 percent of the aged population relied on Social Security for half or more of their total income. They further report that the importance of Social Security as a source of income increases dramatically for the low-income elderly (those with incomes of $5,000 or less). Whereas Social Security accounted for 37 percent of the income of the aged population as a whole in 1981, it accounted for nearly 80 percent of the income of low-income elderly persons for that year. It is expected that Social Security will continue to be the largest single source of income for the aged population and that a majority of elderly families will receive over half of their income from Social Security at the turn of the century (Congressional Clearinghouse on the Future 1984).

TABLE 2-12

RELATIVE CONTRIBUTION OF VARIOUS INCOME SOURCES FOR OLDER PERSONS IN 1967 AND 1981

Sources of Income	Year	
	1967	1981
Earnings	29	25
Social Security	34	37
Pensions	12	13
Asset income	15	23
Public assistance	4	1
Other	6	1

SOURCE: Congressional Clearinghouse on the Future (1984) p. 7.

Earnings. Income from earnings (employment wages and salaries) is the second largest single source of income for the aged population, accounting for 25 percent of the income of the elderly in 1981. This figure is somewhat misleading, however, because the actual amount of money within this income source is concentrated among a smaller percentage of elderly persons. Approximately 12 percent of the elderly population was employed in 1981, yet they were responsible for 25 percent of the total income of that population for that year. Income from earnings decreased from 29 percent of all income for the aged in 1967 to 25 percent in 1981.

Projections regarding the expected contribution of earnings as a source of income for the elderly in the future are dependent upon the projected rate of labor force participation among the elderly population (discussed in detail in chapter 3). Since the labor force participation rate among the elderly population has been decreasing and is expected to continue to decrease, it is likely that their percentage of income from earnings will also decrease in the near future.

Assets. Income from assets includes interest on savings, dividends paid on investments, rental income from business or residential properties owned, and income from the sale of investments and properties. Income from assets accounted for 23 percent of the total income of the elderly in 1981. As was the case with income from earnings, however, this figure is misleading because it is concentrated among approximately 7 percent of the elderly population. Thus, the majority of elderly persons do not receive any income from assets.

Whether the assets that are owned by elderly persons should be prorated and added to their incomes when assessing the income status of the elderly is another question. If this were to be done, one must distinguish between liquid and nonliquid or illiquid assets (Schulz 1976). Liquid assets are those assets that can readily be converted into cash, including savings and checking accounts, and corporate stocks and bonds. Nonliquid assets require more time to convert into cash, and include real estate, insurance policies, equity in a home or a business, securities, and annuities. Nonliquid assets are not available for day-to-day living expenses.

Schulz (1976) points out that we should be cautious in drawing conclusions based on statistics giving the total assets of the aged population. About half of the elderly population own a home or have equity in it, but unless they sell the home it does not generate any income. On the other hand, outright ownership of a home can significantly reduce expenditures for housing depending on the age and condition of the home which affect the cost of upkeep. Furthermore, many elderly persons obtained the loans for the purchase of their homes at a time when the financing of such loans was at interest rates of 4 to 5 percent. People in this position benefit significantly under present economic conditions because while their outgoing home payments carry a 4 to 5 percent interest fee, they can earn 8 to 10 percent on other largely risk-free investments. Thus, it is to their benefit not to pay off the mortgage on their homes in the current market. In addition, should these persons decide to sell their homes, the inflation in housing prices experienced over the past 20 years would bring them significant profits on their investment.

Schulz (1976) notes, however, that studies conducted by the Social Security Administration have found that prorating assets of the aged does not significantly improve the economic situation for many aged, especially those who are poor. Furthermore, when only liquid assets are prorated, the economic situation of even fewer elderly persons is significantly improved. The Bureau of the Census (1984) also reports that these studies conducted by the Social Security Administration show that only a small fraction of the respondents, mainly those with high incomes, had substantial asset wealth. Asset ownership was common among those approaching retirement age, but the value of the assets owned was low.

Pensions. Income from retirement pensions accounted for 13 percent of the total income of the elderly population in 1981. Among today's elderly, about 28 percent of men and 10 percent of women receive pensions (Congressional Clearinghouse on the Future 1984). The increased number of females in the work force may lead to an increase in the percentage of elderly females who

receive pensions in future; however, women workers still tend to be concentrated in occupations and to exhibit employment patterns that do not lead to maximum pension coverage (Congressional Clearinghouse on the Future 1984).

Public assistance. Income provided through public assistance programs accounted for only 1 percent of the total income of the elderly population in 1981. The majority of the public assistance money for the elderly comes from the Supplemental Security Income (SSI) program, which is a Federal program with State supplements. Although all elderly persons below the poverty level could apply for and would likely receive money through the SSI program, only about half of these elderly persons did so in 1981 (Congressional Clearinghouse on the Future 1984).

In-Kind Income

In addition to the money income received by elderly persons, they receive nonmonetary benefits through Federal and State programs which are referred to as income in kind. A majority of these nonmonetary benefits are provided through Medicare, Medicaid, the food stamp program, and government-subsidized housing programs. Moon (1977) has estimated that nonmonetary benefits add about 10 percent to the income of elderly persons. The percentage of elderly persons, however, who actually receive benefits from each of these four programs in any given year is low. In 1978, 90 percent of Medicare benefits went to less than 20 percent of the elderly population (Hersch, Silverman, and Dobson 1985). The Bureau of the Census (1984a) reported that in 1979 the percentage of households with elderly householders receiving Medicaid benefits was 17 percent; for the food stamp program it was 6 percent, and for government-subsidized housing, 5 percent.

Summary

Even with the limitations of the data on income status and income sources, the data that are available provide enough information to make some assessments of the economic status of the elderly population in the United States. Two questions are of paramount importance. First, what is the relative economic status of the elderly population as a whole in comparison to the rest of the population? Second, what, if any, are the specific differences in economic status between different subgroups within the elderly population?

With regard to the first question, a more specific question can be asked, are the elderly economically worse off as a group

than the rest of the population? The tentative conclusion that can be drawn from the data at hand is that, at the present time, the elderly as a whole are not economically worse off than the rest of the population. Prior to the enactment of more generous social security benefits and other programs in the 1960s and early 1970s designed specifically to assist either elderly persons or low-income individuals, it was clearly arguable that the elderly as a group, with their 30-35 percent poverty rate, were economically worse off than the rest of the population. Most observers agree that the implementation of these programs has served to raise the economic status of the elderly population as a whole, although it is difficult to tell precisely how much because some of the economic benefits from these programs are in kind and not counted as income.

Regarding the second question, it seems clear from the data at hand that, within the elderly population, females are economically worse off than males (unless they are living with their husbands), blacks are worse off than whites, those who do not work are worse off than those who work, and those living alone or with unrelated others are worse off than those living in a family arrangement. Those who are members of more than one disadvantaged group (e.g., females living alone or black females living alone) exhibit an even worse economic status. The disadvantaged economic status of members of these subgroups of the elderly population can be attributed to lifetimes of disadvantaged economic status due primarily to employment histories that were shorter, less stable, and lower paid. The decreased amount of income through the years led to decreased savings, less ability to invest, and little overall accumulation of wealth leaving them with fewer financial resources in their elderly years of life.

CHAPTER 3

LABOR FORCE PARTICIPATION AND ATTITUDES TOWARD WORK AND RETIREMENT

This chapter examines how much those 65-and-over, and those approaching that age, participate in paid employment and how they feel about work, retirement, and retraining. There is a marked discrepancy between expressed desires and expectations to work after becoming 65 and actual labor force participation at that age and even in the 55- to 64-year-old group. Repeated surveys of those approaching 65 indicate a substantial proportion indicate they would like to continue to work. Nevertheless, labor force participation among males 55-and-over has steadily been declining. The actual participation data are presented first and then contrasted with expressed interest in continuing to work.

Labor Force Participation

One of the most significant trends of the past 35 years has been the decline in labor force participation among males 65-and-over (Congressional Clearinghouse on the Future 1984). The labor force participation rate among those 65-and-over has dropped significantly between 1950 and 1980 (see table 3-1). Almost all of this decrease has been due to the drop in participation among males 65 and older from 45.8 percent in 1950 to 19.0 percent in 1980. The participation rate among older females has remained relatively stable over the period dropping from 9.7 percent in 1950 to 8.1 percent in 1980 after first increasing to 10.8 percent in 1960.

The labor force participation rate of 55- to 64-year-olds has remained relatively stable between 1950 and 1980 because of opposite trends among males and females (see table 3-1). Male labor force participation rates among 55- to 64-year-olds have steadily declined over the period, whereas female labor force participation rates for this same age group have increased. The labor force participation rate for all 55- to 64-year-olds stood at 56.7 percent in 1950, rose to a high of 61.6 percent in 1970, and has declined to 55.7 percent in 1980.

The labor force participation rate among 55- to 64-year-old males has steadily declined from a high of 86.9 percent in 1950 to a rate of 72.1 percent in 1980. The rate among females in the same age range, however, increased from 27.0 percent in 1950 to a high of 43.0 percent in 1970 and stood at 41.3 percent in 1980. What has happened, basically, is that a 15 percentage point decrease in male labor force participation rates between 1950 and 1980 has been almost matched by a 14 percentage point increase in female labor participation rates over the same period, resulting in an overall decrease in labor force participation among this age group of only 1 percent.

Labor force participation rates among 45- to 54-year-olds show a relatively steady increase over time between 1950 and 1980. In 1950, the rate was 66.6 percent and it had risen to 75 percent by 1980. The increase, however, was due to the strong increase in labor force participation among 45- to 54-year-old females from 37.9 percent in 1950 to 59.9 percent in 1980. The participation rate among males over the same period actually declined slightly from 95.8 percent to 91.2 percent. Thus, the trends among male and female 45- to 54-year-olds are an extension of the trends seen among males and females in the 55- to 64-year-old age group. The question for the near future is what the working status of the current 45- to 54-year-old age group and the 35- to 44-year-old group will be over the next 20 years.

Disincentives

Economists disagree on the extent to which the declining labor force participation of males 55-and-older can be explained by the more adequate pensions that have become available in the past 3 decades. Schulz (1983) summarizes the evidence in this way:

> While pension developments have undoubtedly had an important impact on labor force behavior and decisions to retire, any precise qualification of the impact or a completely satisfactory explanation of "the retirement decision" has yet to be achieved.
>
> Based on the most recent studies, there seems to be relatively strong indications that higher private pension benefit levels do in fact encourage retirement (p. 246)

TABLE 3-1

LABOR FORCE PARTICIPATION RATES AMONG MIDDLE-AGED AND OLDER PERSONS BETWEEN 1950 AND 2000

[Percentage by Age and Sex Category]

	Age and Sex Categories					
	45-54 Year-Olds		55-64 Year-Olds		65 Years and Over	
Year	Males	Females	Males	Females	Males	Females
1950	95.8	37.9	86.9	27.0	45.8	9.7
1960	95.7	49.8	86.8	37.2	33.1	10.8
1970	94.3	54.4	83.0	43.0	26.8	9.7
1980	91.2	59.9	72.1	41.3	19.0	8.1
Projections						
1990	91.3	67.1	67.5	41.7	15.8	7.3
2000	NA	NA	66.8	43.0	13.2	6.4

SOURCES: U.S. Department of Commerce, Bureau of the Census. Current Population Reports, Series P-23, No. 138, Demographic and Socioeconomic Aspects of Aging in the United States. Washington, DC, August 1984a.

_____. Statistical Abstract of the United States 1985. Washington, DC, December 1984b.

Not only do pension benefits act as an incentive to retirement, provisions of social security and some private plans act as disincentives to continued employment. The most prominent of these is the earnings test that reduces social security payments by 50 percent for every dollar earned above the yearly maximum. Private plans often do not allow additional accural of pension benefits if the individuals continues to work after normal retirement.

The result of these influences and others, such as health conditions, is that less than half of the individuals who are currently retired reflect any real interest in re-entering the work force. Parnes and Less (1985) analyzed longitudinal survey data on men age 60 to 74 who had retired from 2 to 14 years before they were interviewed. They conclude:

> Only a minority manifested any interest in labor market activity in 1981. At best, only two-fifths of the total group of retirees are available for work: the remainder either have health problems that discourage labor market

activity or simply do not choose to work. (Parnes and Less 1985, p. 115)

There is disagreement regarding the future employment participation of older adults (Congressional Clearinghouse on the Future 1984). Some analysts argue that the impending shortage of young workers will be an incentive for employers to retain or hire older workers. Others argue that the enormous increase in workers in their prime working years (those persons currently between 25 and 44) could be a surge from below that will tend to push older workers out of the labor force.

One clear trend, however, is the increasing labor force participation among women in all age categories below 65. The increases seem to be greater among each successively younger 10-year cohort. Given that elderly women are of lower income status, are more dependent on social security income, and more often live alone than men, it may well be the case that labor force participation rates among women 55-and-older will increase significantly in the coming years due to their greater income needs. The trends among males do not indicate any future increases in labor force participation rates within the 55 to 64 or 65 and older age groups, although their rates may have bottomed out at the present time.

Attitudes toward Work and Retirement

Another perspective on propensity to work after age 65 is provided by surveys of individuals approaching that age. Several somewhat different measures of this propensity have been obtained by researchers. A 1979 Harris survey found that 48 percent of those individuals in the sample between 50 and 64 expressed a desire to continue working after age 65 (Drewes 1981). Another Harris survey conducted in 1981 found 43 percent of the sampled individuals 55 or older expressing a desire to work past retirement (Sheppard 1983). The percentage among the second Harris survey group is slightly lower than that among the first group, but the second group is slightly older.

A 1981 study conducted by the American Management Association (AMA) found that more than 40 percent of the sampled individuals aged 50 or older indicated an intention to work beyond the age of 65 (Buchmann 1983). In addition to the difference between the age of the AMA survey group and those of the Harris survey groups, the query of an intention to work beyond 65 retirement age is very different from asking whether one desires to do so. The 1981 Harris survey found that among sample respondents between ages 55 and 64, an intention to continue working until age 65 or beyond was expressed by 67 percent. This figure cannot be compared to the intention to retire figure in the AMA study, however, because

it includes those persons who plan to retire at 65 as well as those who plan to work beyond 65 whereas the AMA figure includes only those in the latter group.

Harris (1974; 1981) also obtained information as to whether the retired persons in the sample had looked forward to their retirement. Approximately 46 percent reported that they had not looked forward to their retirement in both surveys. Another attitude measure about retirement obtained in the 1981 Harris survey showed that those 65 and older agreed by a 50 to 44 percent margin that "older people should retire when they can to give younger people more of a chance on the job" (Harris 1981).

Fillenbaum (1971) found that of all the factors included in a study of retirees in the Piedmont region of North Carolina and Virginia in 1961, intention to work beyond retirement age was the main variable discriminating the working from the nonworking retired. Furthermore, she found that the attitude measure, "looking forward to retirement," was an insignificant predictor of actual retirement in either the 1961 group or another group of those who had retired between 1961 and 1966. These findings are in line with much of the attitude-behavior consistency research which shows that the expression of an intention to do or not do something, although not as accurate as a measure of the behavior itself, is a better predictor of a behavior than is a general attitude regarding the behavior.

According to the 1981 Harris survey, 62 percent of those retirees in the sample 65 and older reported that they left the work force by choice, 27 percent indicated that they were forced to retire because of poor health or a disability, and 8 percent reported that they had to retire because their employers had a fixed retirement age. Retirement by choice was greater among women than men, among whites than blacks, for high school graduates than for non-high school graduates, and for those earning $20,000 or more per year than for those earning less than $20,000 per year (Harris 1981). A longitudinal study conducted by Parnes and others of male workers begun in 1966 found that in 1980, 67 percent of the respondents, who at that time were between the ages of 59 and 73, reported satisfaction with their retirement decision (Parnes 1983). The 1979 Harris survey, however, found that only 52 percent of those who had retired were satisfied with their retirement decision; the other 48 percent reported that they would have preferred to be working (Harris 1979). These figures, of course, cannot be compared because they come from different sample populations, but it is interesting to note the difference between the two.

Harris (1981) found that a sizable majority of those respondents who were 55 or older and still working would prefer to work part-time instead of retiring completely when the time comes

for them to retire. Seventy-nine percent of those between 55 and 64, and 73 percent of those 65 and older expressed such a desire. Among those who want to do part-time work instead of retiring completely, Harris (1981) found that almost half (48 percent) of the 55- to 64-year-olds would prefer switching to a different kind of job rather than continuing to do the same kind of work as in their current occupation. Among those 65 and older, this figure was a much lower 18 percent.

Harris (1981) further found that several flexible work arrangement options at the time of retirement were viewed with favor by those sampled workers who were 55 and older. Eighty percent of this group viewed a greater availability of part-time work as being potentially helpful; 71 percent thought job sharing would be a good idea; 74 percent liked the idea of having a job that would allow a day or two of work per week at home and 57 percent liked the idea of having the freedom to set a 70-hour work schedule over 2 weeks. Among the less favored options, 54 percent of this group felt that a greater availability of full-time jobs would be of little or no help; and 57 percent would <u>not</u> find 4-day workweeks with longer days and 3-day breaks helpful (Harris 1981). There is apparently a clear preference for some form of part-time work beyond retirement age among this group.

Finally, in the 1974 Harris survey, 22 percent of all persons 65 or older reported that they were volunteer workers, and an additional 10 percent expressed a desire to become volunteer workers (Charters 1980). The types of volunteer work most often performed by older persons are in the areas of health and personal care and social work including work in hospitals, transporting the ill and handicapped, visiting the homebound, work in emergency food, clothing and shelter programs, and work in day care and residential youth facilities (Charters 1980).

Interest and Participation in Education and Training among Older Adults

The 1974 and 1981 Harris surveys questioned the sample respondents regarding the extent to which they were interested in participating in a job training program with an aim toward taking on a new job. Although the percentage of those respondents who have an interest in participating in a job training program declines with age, it appears that a significant percentage of all middle-aged and older workers have such an interest. In 1981, 58 percent of those between 40 and 54 were interested in a job training program as were 39 percent of those between 55 and 64, and 22 percent of those between 65 and 69. The 1981 figure of 58 percent for 40- to 54-year-olds represents a relatively sizable increase over a figure of 47 percent of this age group that

expressed an interest in job training in 1974. There was almost no change in interest in job training among 55-64 and 65-69 year-olds between the 1974 and 1981 surveys.

The 1974 and 1981 Harris surveys also obtained information from respondents regarding their participation in educational courses and their reasons for participating in these courses. In 1981, 11 percent of the respondents aged 55-64 were taking at least one educational course as were 5 percent of those respondents 65 or older. These percentages are slightly more than double the percentages of respondents who were taking one or more courses in 1974 where the figures were 5 percent for those 55-64 and 2 percent for those 65 or older.

Among those respondents 40 or older who were taking a course, the percentage of those who listed the acquisition of job skills as one of their reasons for taking the course increased significantly for all age groups between 1974 and 1981. Among those 40-54 years of age, the percentage reporting the acquisition of job skills jumped from 14 percent in 1974 to 68 percent in 1981; the increase among 55- to 64-year-olds was from 24 percent to 56 percent, and for those 65 or older the increase was from 6 percent to 17 percent.

For the year ending in May 1981 to the National Center for Education Statistics (1982) reported almost 2 million courses were taken by people 50 or older for job-related reasons. Of these courses, 15,000 were taken by people 65 and older for the purpose of getting a new job, and 75,000 were taken by people 55 and older for the purpose of obtaining a vocational certificate or diploma (Denniston 1983).

Summary

This chapter has presented two contrasting sets of data. One shows steadily declining rates of labor force participation of men 55-and-over, increased participation by women 45 to 65, and significant proportions of both sexes 50 and over expressing an interest in continuing to work after 65. The main interest, however, is in part-time, flexible work, not the standard 40 hour week. This suggests that the key to continued participation of those 65-and-over in the work force lies more with hiring and employment practices than with retraining. The implications of this judgment are discussed in chapter 5. The next chapter assess the prospects of significant increases in the life expectancy of the elderly.

CHAPTER 4

THE PROSPECTS FOR LIVING LONGER

With the number of problems contending for public attention, it is surprising that the condition of the elderly receives the attention that it does. People are living longer, and those 85 and older are the fastest growing segment of the population. Nevertheless, the proportion of the very old is a small fraction of the total population. As the data in the previous chapters indicated, for the next 25 years the number of people 65 and older will increase more slowly than in previous decades because of the low number of births during the 1930s and first half of the 1940s. Furthermore, the financial status and longevity of older people have steadily improved in the past two decades.

The one exception to this generally positive picture has been the escalation in the cost of medical care for the elderly. Although a number of cost containment actions have been taken, more fundamental change in the delivery and funding of medical care will be needed to bring this escalation under control. It may be the specter of potentially catastrophic medical and nursing home expenses that explains the continued interest in the condition of the old. Everyone anticipates someday being old. Many also must plan for the care of elderly parents or other relatives.

These continuing concerns have already led Congress to increase the age of eligibility for Social Security retirement benefits and to increase worker and employer tax rates in the Social Security Amendments of 1983 (P.L. 98-81). Additional changes in the legislation governing Medicare are likely in the not-too-distant future. If the elderly are receiving this amount of attention when their numbers are growing relatively slowly, what would be the response if their life expectancy were to increase significantly? There are some speculations that major increases are possible (Cetron and O'Toole 1982; Prehoda 1980; Rosenfeld 1985).

This chapter examines current evidence on the possibilities of significant increases in life expectancy and the more controversial issue of alterations in the life span. After this

evidence is presented, three possible scenarios on life expectancy and work are developed.

Life Expectancy and Life Span

Virtually all reputable investigators estimate the maximum possible life span for human beings at about 115 years. There is no reliable evidence of anyone having lived longer. Georgakas (1980) reports the longest documented life is 113 years and 214 days, and Fries (1980) cites an authenticated age of 114. All serious gerontologists dismiss claims of extreme old age as the product of poor records and deliberate falsification. Most investigators in this field make a distinction between life span and life expectancy that shall be followed in this chapter:

> Life expectancy is the average number of years of life expected in a population at a specific age, usually at birth. Life span is the maximal obtainable age by a member of a species. (Schneider and Reed 1985, p. 1159)

Life expectancy is thus a statistical value based on the age at which people die; life span is a theoretical concept. Although people are living longer (i.e., their life expectancy has increased) there is no evidence that the human life span has increased. Any increases in life expectancy in the near future will come from further success in treating the major causes of death: cardiovascular diseases and malignant neoplasms (cancer). Increases in life span, if they are possible at all, await better understanding of the factors involved in aging. Recent research in each of these areas is summarized in the following sections.

Increasing Life Expectancy

There is a widespread impression, shared even by many medical researchers, that increases in life expectancy have resulted almost solely from decreases in death among the young, particularly in neonatal mortality. Fries (1980), for example, states: "For persons 45 years of age and older, life expectancy has increased relatively little; for those 75 years old, the increase is barely perceptible" (p. 131).

McGinnes (1982) has demonstrated, however, that since 1950 the rate of gain in additional expected years of life has been more rapid at older ages than at birth. More years are still being added at birth, but since the 1950s, the percentage increases in additional years have been larger at older ages. Table 4-1 summarizes the relevant comparisons.

TABLE 4-1

LIFE EXPECTANCY AT BIRTH AND AT AGES
65, 75, AND 80 IN 1900, 1954, AND 1980

Age	Average Remaining Lifetime			Change			
				1900 to 1954		1954 to 1980	
	1900	1954	1980[a]	Additional Years	Percentage Increase	Additional Years	Percentage Increase
At birth	49.2	69.6	73.6	20.4	41.5	4.0	5.7
65 years	11.9	14.4	16.4	2.5	21.0	2.0	13.9
75 years	7.1	9.0	10.4	1.9	26.8	1.4	15.6
80 years	5.3	6.9	8.2	1.6	30.2	1.3	18.8

SOURCE: U.S. Bureau of the Census (1984a) Table 5-1, p. 59.

[a]Provisional figures.

In the last 25 years, the largest percentage increases have been at the older ages. In fact, the increases in years at these ages almost matched those in the preceding 50 years, whereas the increase at birth was only one-fifth of the earlier gain. McGinnes (1982) attributes the gains at older ages primarily to the reduction of death from cardiovascular disease. This reduction was caused in part by better clinical management of cardiovascular conditions. More important, however, are "efforts to change the profile of overall cardiovascular risk for Americans" (McGinnes 1982, p. 672). These efforts include better control of high blood pressure, declines in smoking, decreased consumption of foods high in fat, and increases in the proportion of the population engaged in regular exercise.

As impressive as these gains have been, there is still considerable room for improvement. Table 4-2 presents projections of the number of additional years that would have been added to life expectancy at birth and at age 65 in the year 1978 if various causes of death had been eliminated. These data demonstrate that future increases in life expectancy, especially

among those over 65, are primarily dependent on better prevention and treatment of diseases of the heart and circulatory systems. The various changes in health-related habits already mentioned have probably laid a foundation for some future gains. Additionally improvements will require wider adoption of these more healthful habits and greater understanding of the processes involved in cardiovascular diseases.

It should be noted that the additional years shown in table 4-2 are projections beyond the actual life expectancy. Table 4-1 indicated that in 1980 the actual expectancy at age 65 was already 16.4 years; the average 65-year-old could expect to live to be 81. The additional years projected in table 4-2 cannot simply be added to this age because individuals who do not die of an illness that is eliminated may die from another condition (Dublin and Lotka 1937). Nevertheless, if all causes indicated in table 4-2 were eliminated there would obviously be a cumulative, if not simply additive, effect that would move the average life expectancy close to 100.

Progress toward such a goal, however, will probably be gradual. Current knowledge of cardiovascular diseases suggests they are the result of lifetime habits. Although it is possible at an advanced age to realize improvements in cardiovascular functions by stopping smoking and adopting more healthful dietary and exercise practices, the greatest benefits are realized if these practices are followed for a lifetime.

Public knowledge of the relationship of life-style to cardiovascular health became widespread in the mid-1960s. Those in the population that responded to this new knowledge are attentive to such information and concerned with their personal health (Keyfitz 1978). More vigorous educational efforts and other actions will be needed to reach the less responsive segments of the population (Terris 1975). A major increase in life expectancy could be possible if researchers unravel the mysteries of the aging process. Some clues have already been identified, but much more work is needed before attempts to delay aging in humans will be possible.

Increasing the Life Span

As noted already, most respected gerontologists think the human life span is about 115 years. The thrust of most research on aging is not to extend the life span. Instead, it is to increase the quality of life that older people live. There are, however, many investigators attempting to discover what causes

TABLE 4-2

ADDITIONAL YEARS OF LIFE EXPECTANCY
AT BIRTH AND AGE 65 IN 1978
IF VARIOUS CAUSES OF DEATH HAD BEEN ELIMINATED

Cause of Death	Additional Years	
	At Birth	At Age 65
Major cardiovascular diseases	13.9	14.3
Malignant neoplasms[a]	3.1	1.9
Influenza and pneumonia	0.4	0.3
Diabetes mellitus	0.2	0.2
Motor vehicle accidents	0.6	-
All accidents excluding motor vehicle	0.6	0.1
Bronchitis, emphysema, and asthma	0.1	0.1
Cirrhosis of liver	0.3	0.1
Nephritis and nephrosis	0.1	-
Infective and parasitic diseases	0.2	0.1

SOURCE: U.S. Bureau of the Census (1984a) Table 5-10, p. 65.

[a] Including lymphatic and hematopoietic tissues.

aging. The explanations that they offer are informally grouped as wear-and-tear and genetic clock theories (Rosenfeld 1976).

Wear-and-tear theories relate to the progressive decline in the ability of the body to reproduce and repair itself. Several causes of this decline have been proposed. One of the oldest is the cross-linkage theory usually associated with Bjorksten (1977). Cross-linkage is the bonding of adjacent molecules, particularly in deoxyribonucleic acid (DNA), which hampers the cell's ability to reproduce itself. With increasing age, Bjorksten contends, the number of these cross-linkages increases so that the cells and the organs made up of them can no longer carry out their life-sustaining functions.

Some of these cross-linkages are caused by free-radical, unstable atoms that link with any available molecule (Harman 1969). Free radicals are produced by the normal use of oxygen within the cell. The production of additional free radicals is stimulated by various inhaled and ingested chemicals, such as cigarette smoke, polluted air and polyunsaturated fats. Free radicals not only cause cross-linkage, they also damage the cell membrane and disrupt vital functions.

A special type of wear-and-tear theory hypothesizes that the body's immune system--its primary defense against foreign invaders--gradually loses its effectiveness or begins to attack its own body (Walford 1969). The cause could be the gradual buildup of cellular errors through cross-linkage or free-radical damage. These errors could act on cells of the immune system so that they are less effective, or on the other cells of the body so that they appear foreign and consequently are attacked by the immune system.

The slowing of the body's gradual deterioration may explain why caloric restriction is the most documented method of extending the life of laboratory animals (Schneider and Reed 1985). The manner in which this treatment works is not understood, but reduction of calories produces a number of beneficial effects, including improved immunological responses and delayed or lower frequencies of chronic diseases. Although the longevity effects of caloric restriction have been known for over 40 years (McCay et al. 1939), no controlled studies have been conducted with humans.

Genetic clock theories differ from wear-and-tear theories in their assertion that even if all the harmful effects associated with aging could be counteracted, humans are programmed to die. There are two major genetic clock theories often referred to as the Hayflick limit and the death hormone.

The Hayflick limit is associated with the gerontologist Leonard Hayflick (1965), who first published the findings that normal embryonic human fibroblast cells in a laboratory culture reproduce themselves only about 50 times. His results were directly contrary to the accepted knowledge. Since then, however, Hayflick's results have become so widely accepted that his name is associated with them. Not all researchers think that the well-established Hayflick limit for cultured cells is applicable to cells in a living body, nor does Hayflick assert that the limit on cell doublings is a cause of aging. Instead, Hayflick (1980) contends it is likely there are genetically programmed mechanisms that limit the number of times cells can double as well as bring about other age-related losses of cellular functions. In any case, the causes of aging are intrinsic in the makeup of DNA.

The other major genetic theory of aging lies not at the cellular but at the hormonal level. An unidentified, so-called death hormone is hypothesized to be secreted by the pituitary gland. This hormone, in turn, blocks the action of hormones from other glands, particularly the thyroid, bringing upon the loss of function associated with aging.

This theory is most closely associated with Denckla (1974), who no longer conducts research because of the controversy that has arisen around his theories and studies. Other investigators, however, (e.g., Everitt 1973) have advanced similar theories and produced supportive results.

This brief review of the main theories of aging is intended to demonstrate the tentative nature of knowledge in this area. In a recent article in The New England Journal of Medicine, Schneider and Reed (1985) presented an exhaustive review of the evidence on all major interventions that have attempted to extend the life span. Most of the interventions are based on one or more of these theories. Ironically, the one technique that "has most consistently been demonstrated to increase longevity and to affect the broadest range of aging processes is caloric reduction" (pp. 1163-64). This technique is not derived from any of the theories, and there is no generally accepted explanation of how it works.

Schneider and Reed (1985) conclude their review by noting that single-cause theories are probably not adequate:

> Increasing knowledge of the nature of aging processes is revealing multiple mechanisms operating at the molecular, cellular, and organ level. It is therefore unlikely that a single intervention will reverse or arrest all aging processes. (p. 1164)
>
> Until our knowledge of these areas is more complete, progress in the formulation of effective segmental interventions will be very slow. Our principal efforts should therefore continue to be focused on basic research to elucidate mechanisms of the aging processes. (p. 1165)

If the period for long-range planning in education is set at 10-15 years, it is unlikely that there will be any major extension of life expectancy in this period. It is extremely unlikely there will be any treatment available to the general public that will extend the life span. With these as the two basic assumptions, three possible scenarios are presented

regarding the health status and working behavior of individuals 65 years and older.

Three Possible Scenarios

This section presents 3 possible scenarios on the number and condition of elderly people during the next 10 years. The first is a standard world, or most likely, scenario, which assumes there will be no major changes in the trends described in the preceding chapters. The second scenario examines a possible significant increase in life expectancy based on widespread adoption of better health habits. The third presents a combination of circumstances that could lead to significant extensions in the working lives of older people.

These scenarios are not attempts to predict the future. Instead, they are attempts to describe the main trends and conditions that are likely to affect older people in coming years. The alternative scenarios present possible interactions of these influences that could lead to different outcomes. Too little is known about all of these factors--as well as many others that are not considered--to claim that any scenario describes what the actual future will be like. Scenarios can, however, help to inform decisions in the present that determine to some degree what that future will be.

Standard World

The individuals who are 65 and older in 1985 and those who will reach that age during the remainder of the century have lived most of their working lives in the period since World War II. During this period, public and private pension programs covered a growing portion of the population and increased their benefits substantially. In addition, group health insurance programs, which did not exist when most of these retirees had entered the labor force, spread to cover about four-fifths of the population. During this time period there was also a continual movement of workers out of agriculture and manufacturing into service jobs, which are in general less physically demanding and less hazardous.

These developments mean that, as a group, people who are 65 and older--and those who will become 65 in the remaining years of this century--have had better medical care and are more financially secure than previous generations of the elderly. There is, of course, a major qualification to this generalization: it applies to those who have had relatively

continuous employment in what labor economists call the primary labor market (Doeringer and Piore 1971). This is the market that offers steady employment at good wages with a variety of benefits, such as pension plans and health insurance. It is contrasted with the secondary labor market where the jobs are typically seasonal or of short duration, pay low wages, and offer no benefits. Individuals who have worked most of their lives in such jobs have not had the advantages of prepaid health care nor have they earned any pension rights beyond Social Security.

The elderly population in coming years is thus likely to be made up of a majority of generally healthy, financially secure older individuals who have some accumulated wealth and about half of whom receive pensions based on their previous employment as well as from Social Security. In contrast to this relatively comfortable group will be a significant minority, about 15 to 20 percent of those over 65, living in or on the edge of poverty. These are the individuals who will most need or wish to continue working after 65, but they are also those least likely to have skills that are valued in the labor market.

The majority of older people appear to have no strong attachment to work for its own sake. Work is a means to an end. The availability of improved pension programs appears to have provided the incentive for earlier retirement, as reflected in the declining labor force participation rates of males in the 50-65 age range seen in recent years. The participation rates of females, who typically have less continuous employment and consequently acquire fewer pension benefits, have actually increased during the same period.

The increases in life expectancy that those over 65 experienced in the 1970s appear likely to continue. The increased awareness of the effects of smoking, diet, and exercise that began in the 1960s caused many people to give up smoking and to adopt healthier personal habits. Many who were in their middle years in the 1960s and 1970s are or will be part of the 65-and-over population during the remainder of this century. Even without improvements in the medical treatment of cardiovascular disease, improved health habits should somewhat extend life expectancy among the elderly.

Dramatic increases, however, do not appear likely. Major improvements in reducing cardiovascular disease are more related to life-style than to medical discoveries. Most individuals who voluntarily choose to adopt more healthful habits have probably already done so. Additional information is unlikely to influence those who choose to ignore that which is already available. Smokers, for example, continually ignore the health warnings printed on every pack they purchase. If a medical breakthrough

were found that eliminated cancer, it would add only about 2 years to the life expectancy of those over 65.

The prospects for treatments to slow or stop the aging process are virtually nonexistent in this century. The state of scientific knowledge is too rudimentary to warrant testing with humans. Any treatments that appeared feasible would have to undergo extensive testing with animals before human tests could be justified. Many human tests would then be necessary before the treatment could be made available for public use. Caloric restriction could be the exception, but no controlled tests have been conducted with humans in the 40 some years that its effects on longevity have been known, thus testifying to its lack of acceptability as a feasible treatment with humans.

In summary, then, most of those who will be 65 and older during the remainder of this century are likely to be healthier and financially better off and to live a little longer than previous generations in that age group. Assuming modest rates of economic growth and of inflation, most older people will not need or desire paid employment. They will probably want a variety of leisure-time activities, such as travel, games, and hobbies to provide variety and interest to their lives. As the number of elderly and their ability to pay for such services increases, the free market is likely to be responsive to their wishes.

The exception to this generally optimistic picture will be the elderly poor--those without assets or private pensions. Many of these individuals may wish to work to improve their financial condition. Due to the nature of their employment history, however, they are likely to be lacking in salable skills. They are also likely to have received less medical care when they were younger, so the probability of poorer health in their older years is increased. Those who will want to work will need the most assistance to find employment.

The Older Live Longer

The preceding scenario described a most likely, or surprise-free, projection of current trends. This scenario describes a plausible combination of actions and policy decisions that could lead to large increases in life expectancy, as many as 5 additional years, for those over 65 by the year 2000.

Employers could play a key role in increasing life expectancy by encouraging more healthy life-styles among their workers. These could include a ban on smoking at the work site. Smoking would only be permitted in designated locations away from co-workers. Employers could also provide facilities and released time for workers to take part in guided exercise programs

designed to increase their cardiovascular capacity. The widespread adoption of flextime would also contribute to health by reducing the daily stress caused by driving during peak commuting hours.

Employers could be encouraged to adopt such practices by incentives, such as lower premiums, from health insurers. Insurance companies could also offer lower premiums to individuals who refrain from smoking, control their weight, and exercise regularly. Tests are available to certify those who wished to qualify for these preferred rates.

The Federal Government could contribute to increased life expectancy by banning all cigarette advertising and sharply increasing the tax on cigarettes. Vigorous enforcement of environmental regulations would reduce the health risks associated with air and water pollutants. The adoption of Federal dietary guidelines recommending less fat and red meat and more complex carbohydrates could lead many people to change their eating habits. If such guidelines were adopted and people wanted the recommended foods, food processors would be pressured to reduce fat content and provide more low-fat alternatives.

The actions described in this scenario would reduce the risks associated with the three major preventable causes of cardiovascular disease--smoking, high-fat diet, and lack of exercise--and could lead to significant increases in life expectancy in the century.

The Elderly Need to Work

This scenario examines a combination of economic conditions and labor market demand that could lead to large numbers of those over 65 remaining employed. The key assumption in this scenario is that double-digit inflation could return and significantly decrease the purchasing power of pensions that do not have cost-of-living adjustments.

Deficit reduction is the dominant issue presently facing Congress and the administration. All proposals to reduce the deficit through spending cuts or increased taxes are opposed by powerful forces. One of the least painful ways to reduce the real cost of the deficit would be to allow, or encourage, higher rates of inflation. In an inflated economy the deficit would be a less significant proportion of the Federal budget and it would be paid off with less valuable dollars.

Adoption of such a policy would probably come about from a stalemate of other deficit reduction techniques. Its likelihood would be increased if the economy began slowing significantly and the Federal Reserve Board made money more available to encourage economic growth.

In such an economic climate, many of the elderly might wish to supplement their pensions through occasional or part-time work. The demand for such workers could be high during the coming decade, because the number of young people in the age range that primarily works part-time will continue to decline.

The young people who will be seeking part-time jobs in the next 10 years were born for the most part in the 1970s. Babies born in 1970 will be 16 in 1986; those born in 1979 will be 16 in 1995. The number of annual births during the 1970s averaged 288,000 fewer than during the 1960s. Labor force participation among 16-to 19-year-olds has been about 50 percent during recent years. Assuming this rate holds for the coming decade, each year there will be over half a million fewer 16- to 19-year-olds seeking work, much of it part-time, than there were in the previous 10 years. This represents a considerable demand that older adults who wanted to work could fill.

In addition, many of the kinds of jobs that young people hold are projected by the U.S. Bureau of Labor Statistics (Silvestri and Lukasiewicz 1985) among those with the largest job growth in coming years. These include cashiers, secretaries, waiters and waitresses, salesclerks, and food preparation workers.

If the economy remains reasonably healthy, older people who want to work are likely to find increased acceptance from employers. The final chapter in this report examines how vocational programs might best serve the needs of older people.

CHAPTER 5

IMPLICATIONS FOR VOCATIONAL EDUCATION

This report has examined the status of the elderly and past and projected trends regarding their status, the prospects for persons living longer, and the needs and desires of the elderly regarding work and retirement in their later years. The examination of these issues has been directed toward making an assessment of the likelihood that vocational education will need to become more involved in providing training for older persons in future years. This chapter is devoted to making this assessment.

The tremendous difference between the size of the older population during the next 25 years and the size of this population between 2010 and 2030 dictates that the assessment should be divided into two parts--an assessment of the near future from 1986 to 2010 and an assessment of the distant future from 2010 to 2030. Given the changing nature of the factors that influence the labor market and the economy, it will be easier to make an assessment of the near future than the distant future and more will be said about the near future.

The Near Future (1986-2010)

The examination of the status of the elderly and the prospects for living longer lead to the following basic projections:

- The number of elderly will increase relatively slowly until the year 2010.
- There is little indication that the life expectancy of the elderly will increase significantly in the near future.
- About half of those approaching retirement express an interest in continuing to work, primarily on a part-time basis, but actual labor force participation rates among the elderly have been declining for the past 30 years.
- Employment practices and provisions of Social Security and many private pension plans encourage

retirement to secure benefits and discourage additional work force participation once one begins to receive these benefits.

- If the economy begins to experience labor shortages, changes are likely to be made in employment practices, Social Security, and private pension plans to encourage older workers to stay in the work force.

One's assessment of the likelihood of increased labor force participation by the elderly is, therefore, primarily dependent on one's assessment of the likelihood of labor shortages developing. The drop in births after the mid-1960s and the concerns being expressed about the impacts of immigration (Lewis, Murry, and Unger 1985) virtually ensure that the labor force will grow more slowly during the remainder of this century. If the expected rates of factory and office automation actually take place, however, fewer workers will be needed (Silvestri and Lukasiewicz 1985). The future of the economy is the critical variable. If moderate rates of economic growth can be maintained, there well may be labor shortages. If the economy experiences little or no growth, the prospects for older workers--and many others seeking employment--will be bleak. The policy implications of both of these possible scenarios are considered. The first is the standard world, which assumes a continuation of present trends. The second is a labor shortage scenario.

Standard World Policy Implications

The two factors that most influence the retirement decision--health conditions and income status--are not expected to change significantly for older persons. Since the increase in the number of older persons is expected to be modest during the next 25 years, unless there is a major shift in the percentage of older persons who remain in the labor force, the actual numbers of older workers should not change significantly.

The projected participation of the elderly in the work force provides little basis on which to recommend that vocational education should significantly increase its efforts in training older workers. If present trends continue, the main recommendation of this report is a modest one: vocational educators should identify those older persons who need vocational education programs to be able to continue working beyond age 65 and take steps to provide vocational education to these individuals. This group is likely to be comprised mainly of older persons who are economically disadvantaged and thus need to work and who are physically healthy enough that they can still work. This group of economically disadvantaged older persons is also the group of older persons most in need of learning vocational skills. The lack of occupational skills among many individuals in this group

has been a major contributing factor to their economically disadvantaged status. There are already in existence some Federal and State policy initiatives to serve elderly clients.

Federal initiatives. Although there have been several Federal initiatives to provide employment opportunities for older workers, emphasis and support for education and training for middle-aged and older workers has been low. The Age Discrimination in Employment Act of 1967, the Age Discrimination Act of 1975, and the Equal Employment Opportunity Act all contain legislation designed to ensure equitable opportunities in the work place for older persons (Denniston 1983). Specific programs providing employment opportunities for older workers either currently exist or existed at one time under the Comprehensive Employment and Training Act (CETA), Older Americans Act, and the Public Works and Economic Development Act. The Department of Labor, as well, funds several projects aimed at employing older workers, and the Domestic Volunteer Service Act provides funds for senior citizen volunteer programs. Title V of the Older Americans Act, which authorizes the Senior Community Service Employment Program, also allows up to 240 hours of training.

Under the Job Training Partnership Act (JTPA), which replaced CETA, section 124 authorizes utilization of 3 percent of Title II-A funds within a State to provide job training programs for older adults (defined as those 55 or older). Persons eligible to participate in a job training program using these funds, however, must be economically disadvantaged, so the program is not available to the majority of older persons.

The Carl D. Perkins Vocational Education Act of 1984 authorizes, under section 417, the establishment of a grant program to develop and operate model centers for vocational education for older adults. Any center established and operated by an eligible recipient would, among other activities, provide training and retraining of older adults to prepare such individuals for new careers, and provide information, counseling, and support services to assist older individuals in obtaining employment. At the time this was written (December 1985), this section had not been funded.

State initiatives. As in the case with the Federal Government, many State government initiatives regarding employment of older workers have been developed but very few of these have been directly related to the development of education or training programs for older adults. Most of the State initiatives have been in the area of developing legislation or rules and regulations regarding State personnel procedures, employment services, employer tax incentives, and elimination of

mandatory retirement, all geared toward preventing discrimination against or providing opportunities for older workers.

A study by Salkin and Britton (1980) of State plans for vocational education found that few references were made to programs specifically for older adults. What programs do exist are mainly efforts at facilitating the employment of older persons by providing them with information about where to seek employment or developing lists of older applicants for employment. Several States have assembled task forces to study the problem of employment of older workers in their State. Virtually no State programs exist that provide education or training specifically for older adults.

Policy recommendations. The data on the economic status of the elderly indicate that those most likely to need to work are women not living in families, particularly black women. These women are likely to have had less employment experience and consequently have accrued few, if any, retirement benefits. Their limited employment histories also suggest they will be in need of vocational training to increase their chances of employment.

Section 124 of the Job Training Partnership Act could serve as the focus of efforts by both vocational educators and employment and training professionals to serve older workers who need training to be able to continue working. JTPA has the advantage of providing a means of involving and subsidizing employer efforts. If employers are reluctant to hire older workers, providing vocational training will be of little benefit.

Section 202 of the Carl D. Perkins Vocational Education Act lists six population groups on which specified percentages of each State's basic grant must be spent. None of these set-asides are targeted to the elderly, but many of the elderly qualify because of other characteristics. The 3 groups most related are disadvantaged individuals (22 percent of each State's grant), adults who are in need of training and retraining (12 percent), and individuals who are single parents and homemakers (8.5 percent).

These 3 set-asides add up to almost half of each State's grant. Funds available from these sources in combination with funds from JTPA provide an excellent opportunity for creative programming and cooperation between vocational education and JTPA to serve that portion of the elderly who need training to be able to work.

Labor Shortages Policy Implications

If the Nation moves into a period of labor shortages, the receptivity of employers to elderly workers will almost certainly increase. There is some evidence, in fact, that employers' perceptions are becoming more positive. In the last half of the 1970s, Butler (1975) and Rosen and Jerdie (1977) reported that employers thought older workers were less productive, inflexible and resistant to change, and become less intelligent as they grow older. A more recent survey, reported in 1984 by The Conference Board, found only the perception of inflexibility was still held by a majority of employers (National Alliance of Business 1985). On many other traits, such as conscientiousness, loyalty, and judgment, older workers were rated as superior to younger workers by a substantial majority of employers.

Employer options. If employers wish to retain and attract older workers, several options are open to them. The first, and most obvious, is to eliminate mandatory retirement. Although only about 5 percent of retirees report they were forced to retire (Parnes and Less 1985), mandatory retirement ages contribute to an expectation that older workers should stop working. Elimination of mandatory retirement would tend to counteract such an expectation.

A second major option is to modify pension plans to remove the incentives to early retirement and to make later retirement more attractive. The way most plans are now structured, workers do not accrue additional benefits if they continue working beyond the normal retirement age.

A third option would be for employers to shift the policies in their organizations to allow for alternative working arrangements to the standard 40-hour work week. Surveys of individuals approaching retirement indicate a strong preference for a reduced, more flexible work schedule. Denniston (1983) notes that many companies remain reluctant to retain or hire workers on a part-time basis because of the perceived added costs to the company in the area of fringe benefits, employee start-up costs, and the fixed costs of hiring extra workers. She points out further, however, that the Age Discrimination in Employment Act (ADEA) as amended in 1978 allows employers to offer fewer fringe benefits when hiring older workers than would otherwise be required.

A fourth option employers could choose would be to provide training for those elderly persons who either need such training to stay current with the responsibilities of their position or who desire to assume a different position with the organization instead of retiring. Obviously, the two options are not mutually

exclusive and could easily be used in combination to meet the needs of both employers and older employees.

A recent report prepared for the National Alliance of Business (1985), titled Invest in Experience: New Directions for An Aging Workforce, reinforces several of these options and presents examples of firms that have actually adopted them:

- The Northern National Gas Company has a job-sharing option that reduces the work schedule for older workers and enables them to provide on-the-job training to the younger, less experienced workers with whom they share jobs.

- Union Carbide permits hiring of its own retired workers on a part-time or temporary basis through an employment service that specializes in older workers.

- Firms such as IBM, Honeywell, and Polaroid have developed training programs for older workers, whereas Travelers Corporation offers training to retirees in its job bank.

- Bankers Life and Casualty Company of Chicago, Chevron Corporation of California, and others offer preretirement planning programs to help older workers better understand their options. (National Alliance of Business 1985, pp. 13-16)

If labor shortages develop, more employers are likely to adopt the practices reflected in these examples. A basic theme in all of them is a reconsideration of the value of older workers and the adoption of more flexible practices to encourage their continuation in the work force. If significant numbers of employers adopt such practices, expectations among older workers concerning the possibilities of continuing to work are likely to change.

Policy recommendations. In coming years, as the work force grows more slowly, vocational educators should track overall demand for labor as well as expected demand in those occupations for which they traditionally offer training. If the Nation begins to experience labor shortages, older workers--as well as many others currently discouraged from seeking employment--are likely to reenter the work force. Many of these older workers may need retraining and, with more favorable employment prospects, they will be more likely to seek such retraining.

In coming years vocational educators could well see an even more heterogeneous mix of people seeking training in postsecondary and adult programs. Some of these may be older

people who need to work for economic reasons, but others may wish to move into occupations that are different than those they pursued through most of their working lives. Providing training for such career shifts is likely to become the responsibility of the public sector. Even employers who are willing to retain older workers in the job they hold would be less likely to train them for new jobs because of the shorter period in which to receive a financial return on the cost of training.

Whether older people need specialized programming and instructional styles is a matter of some debate. Charters (1980) and Denniston (1983) contend that older adults do not require any major adaptations or the development of special programs. Others, however, (Birren and Schaie 1985) cite changes in information acquisition and processing associated with aging that can be accommodated by modifications in instruction. Vocational educators should be aware of the possibility of appropriate modifications and be prepared to make them if they are needed.

Vocational educators should also be prepared to assist in retraining and updating older workers whom employers wish to retain. Many States already offer customized training to employers. In a labor shortage environment during a period of rapid technological change, such a role could expand greatly.

The Distant Future (2010-2030)

As stated earlier, it is more difficult to anticipate conditions in the distant future because of the unknown nature of the factors that will influence the labor force and the economy. One factor of absolute certainty, however, is that there will be a tremendous increase in the older population between 2010 and 2030. The expected increases in the number of older persons should alone account for greater numbers of older workers, even if the percentage of labor force participants among this age group remains at its current level or declines slightly.

The increased number of older persons, however, will account for more retirees as well as more employees. If the labor force participation rates among older persons during the 2010-2030 period remain at the same level as they currently are, it would seem apparent that the Nation's economy could not possibly support the Social Security system for so many retirees. Due to the smaller birth cohorts in the population between 1965 and 1985, Lawson (1979) has projected a ratio of workers to Social Security beneficiaries of 2 to 1 by the year 2025. Of course if birth rates increase between now and 2000, this ratio will increase. Should the population aged 18-54 during the period 2010-2030 be about the size that is predicted, then the Nation is likely to have a need for at least some of its older workers to

continue working instead of retiring. This need for older workers might be dealt with simply by employers' retaining some of their older workers in the same capacity, or there may be a need for vocational training of some older workers to keep them in the labor force. That is a question that cannot be answered at this point, but there is a possibility that vocational education for some older persons may be needed during this period. An accurate determination of actual need should be made at a point in time closer to the period in question.

An additional factor raised by Denniston (1983) that could affect the need for vocational education of older persons in the distant future is the potential strain on the health care system that the large aged population will have. A study by the Rand Corporation (1982) predicts that by the year 2010 there will be unprecedented strains on the health care system. Although today families provide the single most important support system for older persons in the United States (Shanas 1979), this support system may largely collapse during the 2010-2030 period due to a number of factors, such as the greater number of those over 65 without children and changing attitudes regarding responsibility of caring for one's aged parents.

This situation would cause the work force in the health care system to increase to provide care for more older persons. Given the desire among many older persons to provide personal and health care support, there is the potential for drawing many of the additional workers in health care from the older population. Some of the additional workers would likely be volunteers. Whether working for pay or in a volunteer capacity, there is the potential that vocational education could have a role to play in training some of these health and personal care workers. If there is a role for vocational education in this area, preparation for filling this role should not be delayed until the time that the need occurs. It will be important to monitor any changes in the need for health and personal care workers so that any necessary preparation can occur to deal effectively with the need.

In sum, the basic conclusion of this report is that if present trends continue, the most appropriate role for vocational education with regard to older persons is to identify and serve those who need training to be able to continue working beyond age 65. There is the possibility, however, that there could be a need for an expanded vocational education effort with older persons should there exist labor market shortages in many occupational areas. Such shortages appear necessary to bring about changes in the practices of employers that would encourage older workers to continue in the labor force. The more distant future is more difficult to anticipate. There will be far more older people and unless there are very large increases in the

productivity of the working population--and a willingness of workers to share a large portion of the benefits of these increases with retired people--it seems likely that more older people will have to work. Vocational educators should continue to monitor the critical factors affecting the fluctuations in the older work force to ascertain the extent of a need for vocational education of older persons.

APPENDIX A

A MODEL OF MAJOR INFLUENCES ON VOCATIONAL EDUCATION

APPENDIX A

A MODEL OF MAJOR INFLUENCES ON VOCATIONAL EDUCATION

Figure 1 presents the model of major influences upon vocational education that has guided the scanning activities of this project. The model is based on expert judgment because there is no body of existing theory that could be used in its development. In its present state, the model serves as a guide to the assembly and subjective integration of information relevant to the environment that influences vocational education. National goals, the economic environment, the role emerging technologies play in determining skill and training requirements, and the impact of the composition of the labor force and long-term demographic trends compose the major components of the environment for vocational education. The model cannot attempt to delineate every interaction between components of the system without becoming hopelessly complicated. Therefore, the model attempts the more modest objective of depicting the most powerful and pervasive of the relationships.

The model can be divided into three major sections that have some interactions across sections, with the majority of interactions within each section. The first major section relates to the economic climate and the role of government. The political and economic climate sets the stage for all domestic endeavors. This section includes the interaction between the Nation's government and the economy and their relationship to the public's perception of the value of education.

The model of technological innovation and the diffusion of that innovation comprise the second major section of the model. Before society feels the impact of any technology, a technological innovation must be commercially feasible as well as commercially diffused (Rosenberg 1976). Historically, the diffusion and application of innovations have first improved upon currently applied processes in society. Later, in their application stage, the innovations are applied in ways that have never before been considered. In anticipating the impact of technologies, it is easier to identify those impacts that are improvements to old techniques and processes, but much more difficult to anticipate applications that have never before been considered. One of the major interactions across sections is between the diffusion of technology and economic activity. Mensch (1979) has even proposed that spread of basic new technologies through the economy and eventual overinvestment in them are the primary causes of long-term business cycles.

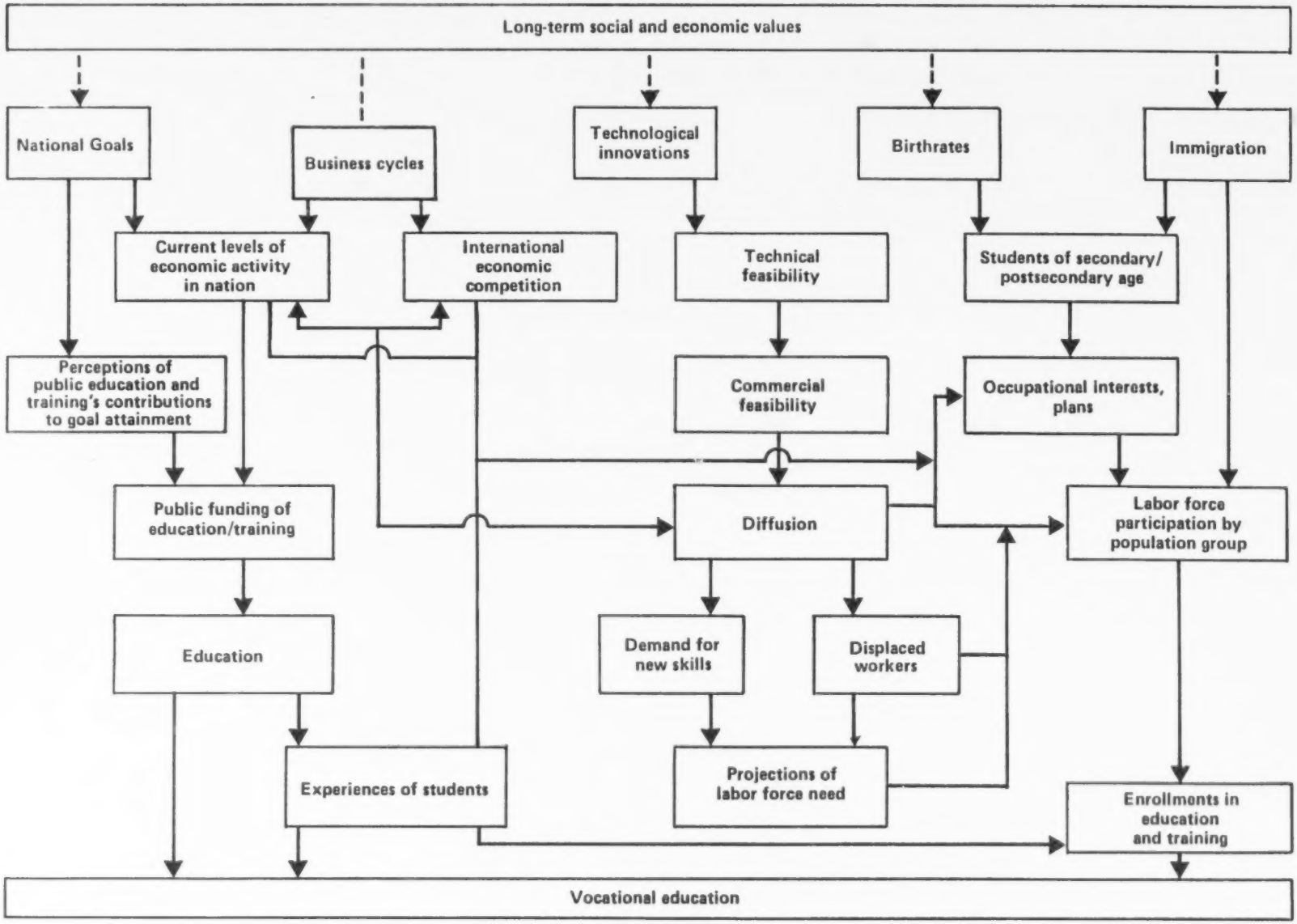

Figure 1 . Major influences on public education and training programs

Demographic trends and the composition of the labor force comprise the last major section of the model. The aging of the post-World War II baby boom and the changes in the composition of the labor supply are issues that have direct impact upon vocational education, since these forces affect the supply of the potential clients for education and training.

Occupational plans, labor force participation rates, and enrollments in education and training programs are obviously influenced by several of the elements in the other sections of the model. The most significant of these relationships are shown. They include the educational experiences of students, levels of economic activity, projections of labor force needs, displacement of adult workers by technological change, and international competition.

Previous Publications

The following are various publications and presentations that were based on the information developed for this project.

Technical Reports of the National Center

Lewis, Morgan V.; Fraser, Jeannette L.; and Unger, Paul V. Anticipating Future Influences on Vocational Education. (1984) (ED 245 061)

Fraser, Jeannette L.; Unger, Paul V.; and Lewis, Morgan V. Robotics and Office Automation: Implications for Vocational Education. (1984) (ED 240 269)

Future Influences on Vocational Education. (Special Publication Series no. 46) (1984) (ED 255 740)

Lewis, Morgan V.; Murry, Robyn A.; Unger, Paul V. Forces and Factors Likely to Influence Vocational Education: Career Plans and Immigration. (1985) (ED 255 763)

Fraser, Jeannette L. Laser Applications: Implications for Vocational Education. (1985) (ED 255 760)

Facts and Findings (Research and Policy reviews published by the National Center)

"Robotics and Office Automation: Implications for Vocational Education." 2, no. 5 (Winter 1984)

"Office Automation and Robotics: Case Studies of State-of-the-Art Programs." 3, no. 1 (Winter 1985)

"Immigration: Implications for Vocational Education." 3, no. 8 (Summer 1985)

"Changes in Career Plans: Implications for Vocational Education." 3, no. 11 (Fall 1985)

Professional Publications

Lewis, Morgan V. "Encouraging Increased Employer Involvement." Workplace Education 2, no. 2 (November/December 1983): 13-15.

Lewis, Morgan V. and Fraser Jeannette L. "Taking Stock of National Trends." VocEd 59, no. 4 (May 1984): 26-28.

Unger, Paul V. and Fraser, Jeannette L. "Multilevel Training Necessary for Multi-function Office and Worker." Words 13, no. 2 (August/September 1984): 40-42.

Unger, Paul V. and Fraser, Jeannette L. "Implications of Office Automation for Vocational Education for Vocational Education." AISP, Education and Training Exchange (Winter 1984): 16-17.

Lewis, Morgan V. "Labor Market Needs to the Year 2000." In Adults and the Changing Workplace. 1985 Yearbook of the American Vocational Association. Arlington, VA: American Vocational Association, 1985.

Lewis, Morgan V. "Reaction to the Changing Workplace." Journal of Industrial Teacher Education 23, no. 1 (1985): 36-39.

Professional Presentations

The following presentations were made by Morgan Lewis.

"Occupational Forecasting." Conference on Emerging Occupations: Training and Retraining for What? National Alliance of Business-Ohio Management Training Institute, The Ohio State University, Columbus: June 9, 1983.

"Testimony to Select Committees on Employment and Civil Service," Ohio House of Representatives. Columbus: June 27, 1983.

"Technological Change and Training for Employment." High Technology Conference, Association of Training and Employment Professionals, North Haven, Connecticut, July 14, 1983.

"Anticipating the Future for Technical Education." Technical Education Division, American Vocational Association Convention, Anaheim, California, December 4, 1983.

"Future Influences on Vocational Education." Professional Development Conference, North Central Regional Education Service Agency, Morgantown, West Virginia, February 28, 1984.

"Changing Occupational Trends for the 1990's." National Curriculum Study Institute, Association for Supervision and Curriculum Development, New York, New York, March 9, 1984.

"Futures Research and Strategic Planning: Some Personal Observations." Symposium on Translating Futures Research into Program Planning, American Vocational Association Convention, New Orleans, Louisiana, December 1, 1984. (symposium organizer).

National Center-Sponsored Activities

National Academy for Vocational Education

"National Conference on Vocational Education and Training Policy for Today and Tomorrow." Held in Washington, D.C., March 15-16, 1984 in cooperation with the National Advisory Council on Vocational Education; National Commission for Employment Policy; and Office of Vocational and Adult Education, U.S. Department of Education.

"Taking Charge: The Future for Vocational-Occupational Education." Held in Kansas City, Missouri, September 29-30, 1984; Columbus, Ohio, October 4-5, 1984; Orlando, Florida, October 9-10, 1984.

"Dealing with the Forces of Time." Presented to Midwest Regional Leadership Conference, Indianapolis, Indiana, July 10, 1985.

"The Future Environment for Vocational Education." Seventh Nationwide Vocational Education Conference, Columbus: November 13-15, 1984.

APPENDIX B

INFORMATION SOURCES SCANNED ON A CONTINUING BASIS

APPENDIX B

INFORMATION SOURCES SCANNED ON A CONTINUING BASIS

Federal Government

Congress of the United States
- Congressional Budget Office
- Congressional Clearinghouse on the Future
- Office of Technology Assessment

Office of the President
- Council of Economic Advisers

Department of Commerce
- Bureau of Census
- Bureau of Economic Analysis
- Bureau of Industrial Economics

Department of Education
- Center for Statistics
- Office of Research and Improvement

Department of Labor
- Bureau of Labor Statistics

Other Sources

Futures Research Journals
- Futures
- The Futurist
- Future Survey
- John Naisbitt's Trend Letters

Education Sources
- Education Daily
- Education Week
- Educational Evaluation and Policy Analysis
- Educational Researcher
- Phi Delta Kappan
- Review of Educational Research
- Vocational Education Journal

Business Publications

- American Demographics
- Business Week
- Fortune
- Trade journals serving selected technologies
- Trend Analysis Program, American Council of Life Insurance
- NFIB (National Federation of Independent Business) Quarterly Economic Report

Technology Journals

- Discover
- Research and Development
- Technology Review

REFERENCES

"At Home With High Technology" (Special Issue). IEEE Spectrum 22, no. 5 (May 1985): 34-112.

Bergsten, C. Fred. "The Second Debt Crisis is Coming." Vital Speeches 51, no. 12 (1 April 1985): 358-363.

Birren, James E., and Schaie, Krause W., Eds. Handbook of the Psychology of Aging. New York: Van Nostrand-Reinhold, 1985.

Bjorksten, Johan. "Pathways to Decisive Extension of the Human Specific Lifespan." Journal of the American Geriatrics Society 25, no. 9 (1977): 396-399.

Bridgeman, Anne. "States Launching Barrage of Initiatives, Survey Finds." Education Week 4, no. 20 (6 February, 1985): 1, 31.

Buchmann, Anna Marie. "Maximizing Post-Retirement Labor Market Opportunities." Chapter 6 in Policy Issues in Work and Retirement, edited by Herbert S. Parnes, pp. 109-129. Kalamazoo, MI: W. E. Upjohn Institute for Employment Research, 1983.

Butler, Robert N. "The Relation of Extended Life to Extended Employment Since the Passage of Social Security in 1935." Milbank Memorial Fund Quarterly/Health and Society. 61, no. 3 (1983): 420-429.

Butler, Robert N. Why Survive? Being Old in America. New York: Harper and Row, 1975.

Cetron, Marvin, and O'Toole, Thomas. Encounters with the Future. New York: McGraw-Hill Book Company, 1982.

Charters, Margaret A. Vocational Education for Older Adults. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1980.

Coale, Ansley J. "The Effects of Changes in Mortality and Fertility on Age Composition." Milbank Memorial Fund Quarterly 34, no. 1 (January 1956): 79-114.

Colvez, A., and Blanchet, M. "Disability Trends in the United States Population, 1966-76; Analysis of Reported Cases." American Journal of Public Health 71 (1981): 464-471.

Committee for Economic Development Investing in Our Children. New York: CED, 1985. (Executive Summary reproduced in Education Week 5, no. 2 (11 September 1985): 17.

Congressional Clearinghouse on the Future. Tomorrow's Elderly: Issues for Congress. Washington, DC: U.S. Congress, September 1984.

Currence, Cindy. "Reforms Could Increase Dropouts, Dilute Curriculum, Study Says." Education Week 5, no. 7 (16 October 1985): 5.

Denckla, W. Donner. "Role of the Pituitary and Thyroid Glands in the Decline of Minimal O^2 Consumption with Age." Journal of Clinical Investigation 53, no. 2 (1974): 572-581.

Denniston, Denie. Older Workers: What Voc Ed Can Do. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1983.

Doeringer, Peter B., and Piore, Michael. Internal Labor Markets and Manpower Analyses. Lexington, MA: D. C. Heath and Company, 1971.

Drewes, Donald W. Education and Training for Older Persons: A Planning Paper. Raleigh, NC: Conserva, Inc., May 1981.

Dublin, L. I., and Lotka, A. J. "Uses of the Life Tables in Vital Statistics." American Journal of Public Health 27, no. 6 (1937): 481-491.

Education Commission of the States. Reconnecting Youth: The Next Step of Reform. Denver, CO: ECS, 1985.

Education Turnkey Systems, Inc. Use of Computers in Education. Research Report Series. Washington, DC: National Commission for Employment Policy, 1985.

Everitt, A. V. "The Hypothalamic-Pituitary Control of Aging and Age-related Pathology." Experimental Gerontology 8, no. 5 (1973): 265-277.

Feldman, Jacob. "Work Ability of the Aged under Conditions of Improving Mortality." Statement before the National Commission on Social Security Reform, 21 June 1982. Unpublished document.

Flatey, Marie E. "The Dvorak Keyboard a Tool for the Information Age." Business Education Forum 39, no. 5 (February 1985): 13-14.

Fillenbaum, Gerda G. "The Working Retired." Journal of Gerontology 26 (1971): 82-89.

Fries, James F. "Aging, Natural Death, and the Compression of Morbidity." New England Journal of Medicine 303, no. 3 (1980): 130-135.

Fries, James F., and Crapo, Lawrence M. Vitality and Aging: Implications of the Rectangular Curve. San Francisco: W. H. Freeman and Company, 1981.

Georgakas, Dan. The Methuselah Factors. New York: Simon and Schuster, 1980.

Harman, Denham. "Prolongation of Life: Role of Free Radical Reactions in Aging." Journal of The American Geriatrics Society 17, no. 8 (1969): 721-735.

Harris, Louis & Associates. The Myth and Reality of Aging in America. Washington, DC: National Council on the Aging, 1974.

Harris, Louis & Associates. Aging in the Eighties: America in Transition. Washington, DC: National Council on the Aging, 1981.

Hayflick, Leonard. "The Limited in Vitro Lifetime of Human Diploid Cell Strains." Experimental Cell Research, 37, no. 3 (1965): 614-36.

Hayflick, Leonard. "The Cell Biology of Human Aging." Scientific American 242, no. 1 (January 1980): 58-65.

Hermalin, Albert I. "The Effect of Changes in Mortality Rates on Population Growth and Age Distribution in the United States." Milbank Memorial Fund Quarterly 44, no. 4, Part 1 (October 1966): 451-469.

Hersch, Bennett; Silverman, Herbert A.; and Dobson, Allen. Medicare: Health Insurance for the Aged and Disabled 1976-78, Summary Utilization and Reimbursement by Person. Washington, DC: Health Care Financing Administration, 1985.

Hooper, Susan. "School Reforms Said to Cut Time for Vocational Training." Education Week 4, no. 38 (12 June 1985a): 6.

Hooper, Susan. "States Link Funding to Vocational Programs' Job Placement." Education Week 5, no. 11 (13 November 1985b): 1, 12.

Katz, Sidney et al. "Active Life Expectancy." New England Journal of Medicine 309, no. 20 (1983): 1218-1224.

Kent, Saul. "What Is the Maximum Human Life Span?" Geriatrics 36, no. 8 (August 1981): 123-130.

Keyfitz, N. "Improving Life Expectancy: An Uphill Road Ahead." American Journal of Public Health 68, no. 12 (1978): 954-956.

Knowles, Daniel E. "Keeping Older Workers on the Job: Methods and Inducements." Chapter 5 in Policy Issues in Work and Retirement, edited by Herbert S. Parnes, pp. 99-108. Kalamazoo, MI: W. E. Upjohn Institute for Employment Research, 1983.

Lawson, F. H. "Private Enterprise and the Older Worker: What Are the Issues?" Aging and Work 2, no. 1 (1979): 7-11.

Leontief, Wassily, and Duchin, Faye. The Impact of Automation on Employment, 1963-2000. New York: Institute for Economic Analysis, New York University, 1984.

Lewis, Morgan V.; Murry, Robyn A.; and Unger, Paul V. Forces and Factors Likely to Influence Vocational Education: Career Plans and Immigration. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1985.

McCay, C. M.; Maynard, L. A.; Sperling, G.; and Barnes, LeRoy L. "Retarded Growth, Life Span, Ultimate Body Size and Age Changes in the Albino Rat after Feeding Diets Restricted in Calories." Journal of Nutrition 18, no. 1 (1939): 1-13.

McGinnes, James M. "Recent Health Gains for Adults." New England Journal of Medicine 306, no. 11 (18 March 1982): 671-673.

McDill, Edward L., and Natriello, Gary. Raising Standards and Retaining Students: The Impact of the Reform Recommendations on Potential Dropouts. Baltimore, MD: Center for Social Organization of the Schools, Johns Hopkins University, 1985.

Mensch, Gerhard. Stalemate in Technology: Innovation Overcomes The Depression. Cambridge, MA: Ballinger, 1979.

Moon, Marilyn. The Measurement of Economic Welfare: Its Application to the Aged Poor. New York: Academic Press, 1977.

National Alliance of Business, Invest in Experience: New Directions for an Aging Workforce. Washington, DC: NAB, 1985.

National Center for Education Statistics. "Participation in Adult Education, May 1981." Early release document. Washington, DC: National Center for Education Statistics, U.S. Department of Education, June 1982.

National Coalition of Advocates for Children. Barriers to Excellence: Our Children at Risk. Boston: National Coalition of Advocates for Children, 1985.

National Commission on Secondary Vocational Education. The Unfinished Agenda. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1984.

Omran, Abdel R. "Epidemiologic Transition in the United States: The Health Factor in Population Change." Population Bulletin 32, no. 2 (May 1977): entire issue.

Parnes, Herbert, ed. "Introduction and Overview." Chapter 1 in Policy Issues in Work and Retirement. Kalamazoo, MI: W. E. Upjohn Institute for Employment Research, 1983.

Parnes, Herbert S., and Less, Lawrence J. "The Volume and Pattern of Retirements, 1966-1981." Chapter 3 in Retirement Among American Men, by Herbert S. Parnes and others, pp. 57-89, Lexington, MA: D. C. Heath and Company, 1985.

Petre, Peter. "Speak Master Typewriters That Take Dictation." Fortune 111, no. 1 (7 January 1985): 74-78.

Prehoda, Robert W. Your Next Fifty Years. New York: Ace Books, 1980.

Rajan, Amin. "Office Technology and Clerical Skills." Futures, 17, no. 4 (August 1985): 410-413.

Rosen, B., and Jerdie, T. H. "Too Old or Not Too Old?" Harvard Business Review 55 (November-December 1977): 97-106.

Rosenberg, Nathan. Perspective on Technology. New York: Cambridge University Press, 1976.

Rosenfeld, Albert. Prolongevity. New York: Alfred A. Knopf, 1976.

Rosenfeld, Albert. Prolongevity II. New York: Alfred A. Knopf, 1985.

Salkin, M. R., and Britton, M. D. Education and Training for Older Persons: A State of the Art Summary Report. Interim report. Raleigh, NC: Conserva, March 1980. (ERIC No. ED 204 597)

Schneider, Edward L., and Brody, Jacob A. "Aging, Natural Death, and the Compression of Morbidity: Another View." New England Journal of Medicine 309, no. 14 (1983): 854-856.

Schneider, Edward L., and Reed, John D., Jr. "Life Extension." New England Journal of Medicine 312, no. 18 (1985): 1159-1168.

Schulz, James H. The Economics of Aging. Belmont, CA: Wadsworth Publishing Company, 1976.

Schulz, James H. "Private Pensions, Inflation and Employment." In Policy Issues in Work and Retirement, edited by Herbert Parnes, pp. 241-264. Kalamazoo, MI: W. E. Upjohn Institute for Employment Research, 1983.

Shanas, E. "Social Myth as Hypothesis: The Case of the Family Relations of Old People." Gerontologist 19 (February 1979): 3-9. (ERIC No. EJ 195 801)

Sheppard, Harold L. "Discussion of Chapter 5, Keeping Older Workers on the Job: Methods and Inducements, and Chapter 6, Maximizing Post-Retirement and Labor Market Opportunities." In Policy Issues in Work and Retirement, edited by Herbert S. Parnes pp. 145-149. Kalamazoo, MI: W. E. Upjohn Institute for Employment Research, 1983.

Silvestri, George T., and Lukasiewicz, John M. "Occupational Employment Projections: The 1984-1995 Outlook." Monthly Labor Review 108, no. 11 (November 1985): 42-57.

Smith, Donald N., and Heytler, Peter. "Industrial Robots: Forecasts and Trends." Delphi Study, 2d ed. Dearborn, MI: Society of Manufacturing Engineers, 1985.

Southern Regional Education Board. 10 Recommendations for Improving Secondary Vocational Education. Atlanta, GA: Southern Regional Education Board, 1985.

Terris, Milton. "Breaking the Barrier to Prevention: Legislative Approaches." Bulletin New York Academy of Medicine 51, no. 5 (1975): 242-257.

Terris, Milton. "Prevention, the Aged, and the Costs of Medical Care." Journal of Public Health Policy 5, no 2. (June 1984): 157-164.

Tsai, Shan P.; Lee, Eun S.; and Hardy, Robert J. "The Effect of a Reduction in Leading Causes of Death: Potential Gains in Life Expectancy." American Journal of Public Health 68, no. 10 (1978): 966-971.

Tsai, Shan P.; Lee, Eun S.; and Kautz, Judith A. "Changes in Life Expectancy in the United States Due to Declines in Mortality, 1968-1975." American Journal of Epidemiology 116, no. 2 (1982): 376-384.

U.S. Bureau of the Census. Demographic and Socioeconomic Aspects of Aging in the United States. Current Population Reports, Series P-23, No. 138. Washington, DC: Government Printing Office, 1984(a).

U.S. Bureau of the Census. Statistical Abstract of the United States: 1985 (105th edition). Washington, DC: Government Printing Office, 1984(b).

U.S. Department of Labor. Bureau of Labor Statistics. Occupational Projections and Training Data, 1984 Edition. (Bulletin 2206). Washington, DC: Government Printing Office, May 1984.

Verbrugge, Lois M. "Longer Life but Worsening Health? Trends in Health and Mortality of Middle-Aged and Older Persons." Milbank Memorial Fund Quarterly: Health and Society 62, no. 4 (1984): 475-518.

Vladeck, Bruce C., and Firman, James P. "The Aging of the Population and Health Services." Annals of the American Academy of Political and Social Science 468 (July 1983): 132-148.

Walford, Roy L. The Immunologic Theory of Aging. Baltimore, MD: William & Wilkins, 1969.

Williams, Shirley. "Values, Resources, and Politics in America's Schools." Education Week 4, no. 25 (13 March 1985): 24.

Zeman, Zavis P. "When You Can Talk to Your Typewriter." The Futurist 19, no. 6 (December 1985): 46.

U.S. GOVERNMENT PRINTING OFFICE: 1986-647-527